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Epidemiological Studies in Influenza*

THOMAS FRANCIS, JR., M.D.
Laboratories of the International Health Division, Rockefeller Foundation, New York, N. Y.

INFLUENZA is primarily a clinical and epidemiological syndrome which appears in epidemic waves of varying proportions. In fact, Crookshank [1] states, "the name, 'influenza,' stands not for an entity: not for something with objective existence in nature; but for the triple conception of a disease, an epidemic prevalence, and an epidemic constitution or period." Crookshank represents the school which rightly or wrongly encompasses under the term influenza all forms of infectious disease occurring at a time when illness of epidemic character is widespread. Thus encephalitis, choriomeningitis, infectious mononucleosis, infectious jaundice, staphylococcus food poisoning, and acute respiratory infections occurring at the same time in a given area would represent to his notion different types of influenza.

It is doubtless true that outbreaks of certain diseases may be concomitant with, or followed by certain others, and that one may by its particular mode of attack prepare the soil for another. It is also true that the clinical aspects of a disease vary from individual to individual. But with increasing knowledge of specific causative agents, many diseases which have hitherto been grouped together under some general terminology are being removed and placed in their proper niches. In most instances the study of infectious diseases has resulted in the separation of one or more fairly concise clinical entities from what was previously an inclusive designation. Thus, pneumonias due to different types of pneumococcus, to the hemolytic streptococcus, or to psittacosis virus, have distinctive features and the etiological classification of the cases has shown that the different groups present rather characteristic disease pictures.

At the present time it seems likely that included in the term influenza are several different diseases apparently so similar from a purely clinical standpoint as to be indistinguishable. Many attempts have been made to suggest definitive criteria based upon epidemiological, clinical, or laboratory standards. Epidemiologically the terms pandemic, epidemic, and sporadic influenza have

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been used. Clinically the common cold, grippe, influenza-like, are terms which express the effort toward differential diagnosis. Leukopenia or the demonstration of Pfeiffer's bacillus have been studied as diagnostic aids. But none of the criteria have been sufficiently specific to lead to an exclusive diagnosis.

What then is influenza? I must confess that it is perhaps less difficult to say what it is not. Influenza is not the ordinary head cold usually characterized by running nose and absence of fever; it is not the acute tonsillitis or sore throat of streptococcus origin; it is not the low grade fever of chronic sinusitis with its accompanying malaise; it is not the nausea, vomiting and diarrhea of food poisoning; it is not lobar pneumonia. It is not Rift Valley fever, psittacosis, or jungle yellow fever. Influenza is rather an acute infectious respiratory disease of epidemic nature which is of variable extent and severity. It is characterized by a rapid dissemination, high morbidity, sudden onset with fever, chills, pharyngitis, cough, myalgias, leukopenia, and inconstant bronchitis or pneumonitis. The mortality is low, the immediate recovery is usually prompt after a course of 3 or 4 days, but weakness far out of proportion to the illness may persist for some time. Within the scope of this general definition lies the problem for investigation.

It is impossible within the limits of the present discussion to attempt a review of the great mass of contradictory evidence which has accumulated in the literature on influenza. I shall deal primarily with the more recent studies relating to the virus etiology of the disease.

In 1931 Shope [2] published the first of his papers establishing the fact that swine influenza was produced by a filterable virus in symbiosis with a hemophilic bacterium, *H. influenzæ* suis. The virus agent was found to be the essential component in the cause and dissemination of the disease, and in the immunity which followed infection. The bacterium appeared only to increase the severity of the infection induced by the virus.

In 1933 Smith, Andrewes, and Laidlaw [3] recovered a virus from cases of human influenza following the intranasal inoculation of ferrets with the nasal washings of acutely ill patients. The disease was transmissible from sick ferrets to normal animals by suspensions of nasal turbinates or by direct contact. Recovered animals were immune to reinfection and their serum contained antibodies capable of neutralizing the virus. The same investigators reported that ferrets were also susceptible to swine influenza virus and that the two viruses were somewhat related. Shope [4] then found that if ferrets were anesthetized at the time of their inoculation with swine influenza virus, they developed extensive pneumonia.

In 1934, with material from human patients suffering from influenza in Puerto Rico, we were successful in isolating a strain of virus in ferrets.[5] It was noted in addition that the human influenza virus after a period of adaptation also produced lung lesions in infected ferrets. It was likewise found that mice were susceptible to the Puerto Rico virus, while Andrewes, Laidlaw, and Smith [6] independently reported similar results with the W. S. virus. In mice a fatal disease, with extensive pneumonia, occurs. To date it has not been possible to transfer the disease directly from man to mouse. Only after a period of passage through ferrets has the virus been found capable of producing demonstrable infection in mice. At the present time the P.R. 8 virus is infective for both mice and ferrets in a dilution of 1:1,000,000.

Subsequently we succeeded in cul-

tivating both human and swine [7, 8] influenza virus in the tissue culture medium of Li and Rivers,[9] while Burnet [10] has reported the successful adaptation of the virus to growth on the chorioallantoic membrane of the developing egg.

More recently, Stuart-Harris [11] found that the infection could be transmitted to hedgehogs, producing a disease primarily of the nasal mucous membranes.

In its attributes the virus behaves as other agents belonging to the group of filterable viruses. Elford, Tang, and Andrewes [12] by means of ultra-filtration methods with graded collodion membranes have shown that both the human and swine viruses are of the probable size of 80–120 mu, which is considerably smaller than the ordinary bacteria.

With this brief review of the characteristics of the virus and its pathogenicity, let us turn to a discussion of the relation of the virus to the problems of human disease.

DISTRIBUTION OF VIRUS AND THE NATURE OF THE STRAINS

One of the traditional statements regarding influenza, and against which there is considerable evidence of record, is that one attack of the disease gives rise to little or no immunity. Various reasons have been advanced to account for the supposed lack of immunity. These may be briefly enumerated: (1) The agent responsible for influenza has low antigenic properties; (2) many different strains of virus exist, and cross-immunity does not obtain; (3) immunity develops following the disease but persists for only a short time. A fourth phrase has recently been gaining in prevalence, a pretty phrase but one for which little evidence exists: "general immunity without mucous membrane immunity."

Before any answer to these questions was possible, it was necessary to obtain evidence of the nature of the virus occurring in other epidemics of influenza. In addition to the outbreaks in England in 1933 and in Puerto Rico in the autumn of 1934, a rather widespread incidence of influenza occurred in the winter of 1934–1935. In England, Andrewes, Laidlaw, and Smith [13] recovered several strains from localized epidemics. In our laboratory material was studied from patients in New York, Philadelphia,[14] and, through the kindness of Dr. R. R. Hyde of Baltimore, from an epidemic in Alaska.[15] Strains of virus were recovered from human material collected in each area. In New Haven, Conn., Brightman and Trask also succeeded in isolating strains of virus.[16] In June, 1935, Burnet [17] in Australia recovered a strain of influenza virus from human sources. This past spring, virus was recovered from patients during an extensive outbreak of influenza in Russia.[18] Thus from Alaska to Australia, from Puerto Rico to Russia, the disease has found its way. More important still, the strains of virus have been, so far as can be determined by the methods employed, immunologically indistinguishable. A virus of world-wide distribution has been in each instance associated with a disease typical, clinically and epidemiologically, of true influenza. Can these contiguous outbreaks in different parts of the world be considered pandemic influenza or are they merely numerous unrelated local epidemics? In either case, the evidence seems clearly to establish the etiologic relationship of the virus to the human disease influenza.

While the strains of virus appear to be immunologically identical, certain differences in their pathogenicity have been observed. The virus from Puerto Rico has been rather striking in the speed with which it became adapted to animals. In ferrets, Strain 5, which was subsequently lost, produced gross lung lesions after 6 passages, P.R.8

after 7–11 passages. The Philadelphia virus appeared to produce more marked nasal symptoms than the P.R.8, but lung lesions were not observed in significant extent until the 11th passage, thereafter irregularly and of much lesser extent than with the P.R. 8 strain. The Alaska virus was carried directly through 30 passages with large inocula before infected ferrets exhibited any consistent gross pulmonary consolidation. Still the febrile reaction in ferrets has been quite pronounced with all these strains since the original passage. Furthermore, after the transfer of virus to mice, the Puerto Rico virus rapidly enhanced its virulence and titer for this species of animal, whereas the Alaska virus has been consistently weaker. The latter strain, though having approximately the same end-point in titrations, as measured by lung lesions in mice, requires a much larger dose to produce a fatal infection. It has not yet been successfully maintained in tissue culture under conditions to which the other strains become readily adapted.

It seems quite possible that these quantitative differences in the pathogenicity of various strains for experimental animals may reflect in some degree the severity of the disease which the respective strains might elicit in a human population. For instance, the P.R. 8 virus may represent a strain of severe epidemic capacity, while the Alaska strain might be extremely mild except in a highly susceptible population. From the evidence, no conclusion can be drawn except to note that the P.R.8 strain was infective in a semi-tropical country during a time when excellent weather was the rule; the Alaska strain was obtained from an isolated community in Arctic winter.

STUDIES RELATING TO IMMUNITY

Smith, Andrewes, and Laidlaw in their original publication [3] as well as later [19] pointed out that ferrets which recovered from infection were solidly immune to reinfection. After an indefinite period of 5 months or more, there occurs some decrease in the immunity as measured by active immunity tests. Both of these observations we have been able to substantiate thoroughly.[14] The British workers have emphasized the return to susceptibility but our observations along similar lines seem more to emphasize the residual immunity. The P.R. 8 ferret-passage virus when administered intranasally to normal ferrets in 10 per cent concentration produces a severe disease of fatal proportions, with labored breathing and extensive pulmonary involvement as well as pronounced nasal discharge. The febrile reaction is at times absent because of the severity of the illness. When previously immune ferrets are reinoculated after a period of months with similar material, various degrees of reaction ensue. Some show little or no evidence of illness, others show a brisk, sharp rise of fever with or without mild nasal symptoms, but rarely exhibit significant symptoms of respiratory distress. They usually remain active and eat well. If on the 4th day after inoculation lungs and turbinates of such animals are removed, they show no significant lesions. When strong suspensions of these organs are introduced into a normal ferret, the normal animal does not become ill nor, in our experience, does it develop neutralizing antibodies. These results indicate that free virus is not present in those tissues which in the infected susceptible animal constitute a rich source and that the reinoculated animal possesses the capacity to dispose rapidly of the virus actually introduced.[14] It still retains, therefore, a very effective immunity. The fever and mild nasal symptoms seem to represent an accelerated immune

reaction. Moreover, ferrets in a waning state of immunity in which antibodies still persist can be made completely resistant again by a single vaccinating dose of active virus.

It has not been possible to infect ferrets or mice by any route other than the respiratory tract.[14, 19] When the virus is inoculated subcutaneously or intraperitoneally even in large amounts, no signs of illness are observed. Ferrets so treated develop circulating antibodies but do not become completely resistant to intranasal infection. In fact, they may exhibit fever similar in degree to the fully susceptible normal animal. But Shope [20] and Smith, Andrewes, and Laidlaw [19] demonstrated that the vaccinated ferret does not ordinarily exhibit pulmonary consolidation with doses of virus which uniformly cause pneumonia in control animals. Furthermore, we have tested the lungs and turbinates of vaccinated animals after their intranasal inoculation with virus. Although in one case some lung involvement was even observed, suspensions of lung and turbinate injected into a normal ferret induced neither infection nor the development of antibodies. It would appear, therefore, that vaccination with living human influenza virus induces in the ferret a state of immunity somewhat similar in degree to that exhibited by recovered animals after a lapse of months. The disease is distinctly modified: virus is rapidly disposed of, little or no lung involvement is seen even though well marked fever may occur.

In mice, on the other hand, repeated subcutaneous or intraperitoneal injections of virus elicit not only the formation of antibodies but a solid immunity to intranasal infection with many lethal doses of infectious agent.[14, 19, 20] The results are apparently influenced to some extent by the route of injection, the source of material, and the number of injections. Satisfactory results have been obtained with infected mouse lung, ferret lung, or tissue culture virus by the subcutaneous or intraperitoneal routes.

Vaccinated mice may exhibit some mild pulmonary lesions at autopsy but usually show no lung involvement. Vaccinated mice which have been found to be immune to intranasal inoculation have been retested by us as long as 5 months later and found after that interval still to be completely resistant to intranasal infection with large doses of virus. It is clear, therefore, that vaccination with active virus in the mouse results in a firm, solid immunity unaccompaned by evidence of infection. This immunity so far as can be determined is as complete as that which occurs in recovered mice.

The problem of immunity to influenza in human individuals is beset by many difficulties, the chief of which is, perhaps, the problem of diagnosis. How is one to evaluate the history of an individual who says he has influenza each year? Is it possible that some persons develop a staunch and persistent immunity while others have only a slight and transitory resistance following infection? The epidemiological evidence is in certain ways contradictory since in most instances the conclusions have been based upon the supposition that all outbreaks were the same disease.

During the course of the present studies, the opportunity presented itself to determine the antibody content of the serum of 3 patients while ill with influenza and again in convalescence.[14] In all 3 instances a distinct rise in antibody was observed in convalescence. Similar results were not observed in pneumonia patients or in subjects suffering from common colds. The increased antibody titer was considered definite evidence of specific response to the influenza virus.

In an effort to determine the occurrence of antibodies in the population at large, sera of 136 individuals of different ages were collected along the Eastern Seaboard. They were tested by means of mouse protection tests against the P.R. 8 strain of human influenza virus.[21] The results were classified as complete, partial, or no protection. Of these sera, 49.2 per cent gave complete protection, 29.4 per cent gave partial protection, and 21.3 per cent gave no protection to mice. Distinct differences were observed at different ages. Including all those which exerted a complete or partial protective action, the serum of all new-born infants contains antibody. These antibodies are lost during the 1st year of life but between the 1st and 5th years, two-thirds of the children studied possessed considerable antibody. Thereafter, the curve rises so that from 20 to 40 years of age, 90 per cent of the sera exerted a protective action; thereafter a slight but definite decline was observed. The results suggest the interpretation that approximately half the population after the 1st year of life have a rather high degree of resistance to influenza and that one-third of the same population has a moderate degree of resistance. Whether the so-called partial immunity represents individuals with a waning immunity, or individuals who never reached a high degree of immunity cannot be stated. The fact that this intermediate state increases with age up to 50 years suggests the former probability. The presence of antibodies in young children joins with the fact that the virus has been isolated in recent epidemics to indicate that this virus has been responsible for outbreaks of disease in recent years. Furthermore, the high incidence of either partially or completely protective sera in older individuals is indicative of infection at some previous time, but since the duration of antibodies is not known it is difficult to state whether they are of recent or remote origin. Enough is known to say that antibodies persist for 1 year at least, and that recently convalescent individuals have a high incidence of antibodies.

Somewhat similar results have been obtained in England by Andrewes, Laidlaw, and Smith [13] in a series of 64 individual sera studies. While the percentages of protective sera at different ages differ somewhat, the general trend is the same. Brown [22] in Boston has also reported results of tests made with the sera of children and adults. The chief difference noted is that the serum of children in Brown's series appear to have less antibody than noted in our group. This may well be attributable to variations in the distribution of the disease in the two districts.

The relation between a history of previous attack of influenza and the occurrence of neutralizing antibodies is not extremely sharp. Of 78 individuals above 12 years of age from whom fairly accurate statements were obtained, there were 45 who gave positive histories and 25, or 55.5 per cent of them, possessed potent circulating antibody.[21] Negative histories were obtained from 33 subjects and 39.3 per cent of these had strongly positive sera. On the other hand, the serum of only 9 of 18 individuals who had influenza in 1918 gave complete protection, while of 31 who had influenza, between 1933 and 1935, 27 or 87 per cent possessed high content of circulating antibodies. These results together with those in children suggest that the strongly protective sera are most common among individuals infected in recent years.

RELATION OF HUMAN INFLUENZA VIRUS TO SWINE INFLUENZA VIRUS

The observations of Smith, Andrewes, and Laidlaw regarding the relationship

of the human and swine influenza viruses were based upon experiments in ferrets, and they concluded that a close relationship existed between the two.[3, 19] On the basis of mouse protection tests with anti-swine and anti-human influenza sera, we were able to show that the two were immunologically distinct.[23] Nevertheless, it was found that mice which were immune to either virus also exhibited active immunity against the other.[14, 24] Furthermore, the sera of rabbits and of certain ferrets hyperimmunized with human influenza virus gave cross-protection against the swine virus. This subject was studied in detail in conjunction with Shope.[25] It was found that in practically all cases the response to the primary infection was specific for the virus employed, but that when the animal had been subjected to repeated inoculations with the human virus, the serum then exerted a neutralizing effect upon the swine virus. Cross-protection against human virus with swine serum was, however, much less evident. The two viruses thus appear to possess some common antigenic constituent, although they are distinct entities. In addition, ferrets infected with one strain were clearly immune to the other even though virus-neutralizing antibodies for the heterologous virus were absent from the serum.

In mice, ferrets, and tissue culture, the swine and human strains exhibit much the same characteristics. In ferrets it is true that the disease produced by swine influenza is somewhat more severe from the start. Furthermore, the swine virus can be transmitted directly from its native host to mice.[24] It was of interest, therefore, to determine the capacity of the human virus to infect swine. Elkeles[26] had previously reported success in infecting very young pigs with human influenza virus in conjunction with *H. influenzæ* organisms of human or swine origin, but it was necessary to anesthetize the animals. This problem was reinvestigated by Shope and Francis.[27] It was found that human influenza virus did induce a mild disease in swine, much less severe than that caused by the combined action of swine virus and bacteria. In fact, the illness produced by human virus and bacteria together was rarely more marked than that caused by swine virus alone. The human virus apparently does not aid greatly in establishing the organism in the respiratory tract, nor is the infection readily transmitted by contact as occurs when swine virus is employed. Furthermore, the lung lesions produced by human virus in swine were much less extensive than those of the native disease. Nevertheless, recovery is associated with the appearance of human virus-neutralizing antibodies in the serum of the hog. When the swine are reinoculated with the combined agents of swine influenza, considerable active cross-immunity is found to be present and subsequently exhibited, and then antibodies for both viruses are demonstrable in the blood.

It is seen that while human influenza virus is milder in certain of its pathogenic capacities than the swine virus, the differences are primarily quantitative. After repeated passage through swine, the human virus retained its original immunological characteristics. No evidence of a qualitative change in the human virus in the nature of a transformation to swine virus was observed.

THE RELATION OF VIRUS TO 1918 INFLUENZA

It may be well to consider briefly the information available as to the relation of the known viruses to the 1918 pandemic influenza. It is obvious that an answer to this question cannot be

given dogmatically at the present time. As mentioned previously, however, swine influenza was first observed in the American Middle West in the autumn of 1918. Dr. J. S. Koen, of the U. S. Department of Agriculture, impressed by the similarity of the symptoms to those observed in human influenza, called the disease " hog flu." [28] Since that time the disease has been almost constantly present in swine, occurring from year to year with great regularity.[2] The recovery of a virus of similar characteristics from human influenza reawakened interest in the significance of the swine virus in relation to human disease. Neutralization tests done with human sera against swine influenza virus were carried out by Andrewes, Laidlaw, and Smith,[22] and by Shope [29] with 124 of the same sera which we tested against the human virus. In contrast to the results with human influenza virus, practically no antibodies against swine influenza virus are found in the serum of individuals under 10 years of age, whereas almost all adults have highly protective sera. This would suggest that a high proportion of the adult population had in the past been infected with a virus antigenically similar to that of swine influenza. The absence of such antibodies from the serum of children suggests that the virus has not prevailed in the influenza infections of the past 10 years, but rather has maintained itself in swine, a host to which it became completely adapted. The results, so interpreted, would also indicate that antibodies developed as a result of infection in 1918–1919 have persisted in the serum of individuals for a period of 17 years. Laidlaw [30] and Shope [29] have both emphasized the probability of swine influenza virus representing the 1918 human influenza virus.

Certain other features of the swine virus have been considered of possible significance in this general relation. The fact that the primary pathogenicity of swine virus for mice and ferrets is greater than that of the human virus, and its greater capacity to promote infection by contact or in association with the *H. influenzæ* suis in swine may be reflections of its greater virulence in man and explain the more severe disease which occurred in 1918 than in subsequent outbreaks.

These interpretations are of great interest. At the present one can only state that no virus of the swine type has been recovered from human cases in the past 3 years. Furthermore, the presence of antibodies of some degree against the human strains is almost as high in adults as against the swine virus. And finally, if it should be true that the swine virus is of human origin, it would represent the rare instance of a known human disease leaving its human host to become an established epidemic disease in animals.

It seems, however, that the characteristics of the virus agent alone are not sufficient to explain the severity of the 1918–1919 epidemic. There can be little doubt that the severe pneumonias and the increased fatality were attributable to a high incidence of secondary infections in which the hemolytic streptococcus played an outstanding rôle as it did in the measles epidemics. The highest age incidence of influenza was in childhood, but the highest mortality rate was in adults, especially males, of 20–35, the age group most affected by the dislocation of population. As Jordan says,[31] " Case fatality is doubtless greatly affected by differences in the virulence of the accessory microbes that are mainly responsible for death . . . and perhaps by difference in the virulence of the influenza virus itself. . . . In a word, the factors that determine case fatality in influenza are for the most part acci-

dental and extraneous and are not dependent directly on the nature of the virus."

As previously mentioned, strains of virus of the human type in 1934–1935 were isolated in widely remote parts of the world. Furthermore, South Africa experienced a distinctly widespread outbreak of influenza in the same period. One might assume that the chief difference between this recent experience and that of 1918 was not one of distribution but of severity. Such an interpretation would imply differences in the invasive characters of the respective viruses. Apart from swine influenza, the observations cited above indicate that there are differences in the invasiveness of the strains recovered from human sources. Whether pandemic influenza results from the revival of a strain such as the swine virus or increased adaptation of one of the human strains must await the future for elucidation.

THE RELATION OF INFLUENZA VIRUS TO COMMON COLD

It may be well at this point to discuss briefly the relation between influenza and the common cold. Dochez,[32] and Long,[33] and their coworkers have demonstrated that the common cold can be transmitted by means of bacteria-free filtrates of nasal washings from man to man and to the higher apes. Dochez, Mills, and Kneeland[34] have also reported that bacteria-free cultures of similar material can be carried through many sub-cultures and still retain the capacity to elicit the symptoms of a common cold in normal human subjects. Furthermore, with material from cases of clinical influenza, cultures have been made which when tested in human volunteers produce symptoms of the common cold. The viruses have not been pathogenic, however, for the smaller laboratory animals.

In our laboratory, attempts to cultivate the strains of human influenza virus in the same medium and under the same conditions as those employed for the cultivation of the cold virus have been so far unsuccessful. It appears, therefore, that the viruses are different in their growth requirements and in their pathogenicity for animals.

The possibility that a virus of influenza might after a considerable period of absence from the human organism produce only symptoms of a common cold is not remote. In all epidemics varied degrees of clinical severity are noted. Referring to our observations on the antibody content of human serum, one might readily infer that different degrees of immunity might result in different degrees of illness. This is actually observed in ferrets which can be classified as not immune, partially immune, and completely immune. Furthermore, Smillie[35] has recorded an epidemic of influenza in Labrador in which the illness varied from a mild common cold to severe influenza.

In any case, both the common cold and influenza are important in the incidence of the more severe disease lobar pneumonia. The greater the understanding of either of these conditions, the greater will be its application in unraveling the problem of the other respiratory diseases.

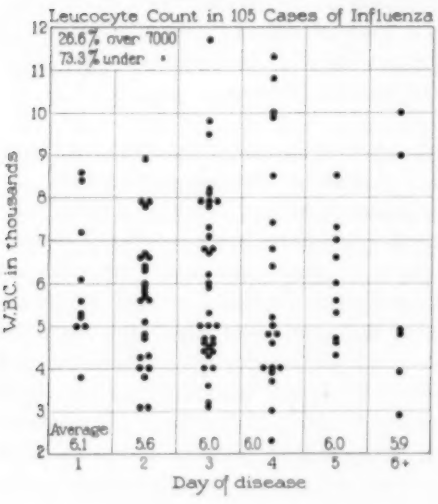
RELATION TO OTHER RESPIRATORY DISEASES OF SIMILAR CHARACTER

While strains of virus of a fairly uniform type have been recovered repeatedly from outbreaks of human influenza in different localities, other outbreaks have occurred from which no virus was isolated. Thus Andrewes, Laidlaw, and Smith[22] failed to recover virus from an epidemic of influenza in the garrison at Woolwich, England, in 1935. Both in England and in our laboratory similar

failures have occurred in attempts to isolate influenza virus from numerous cases of influenza-like infections of sporadic nature. Moreover, completely uniform results have not been obtained in outbreaks from which influenza virus has been isolated.

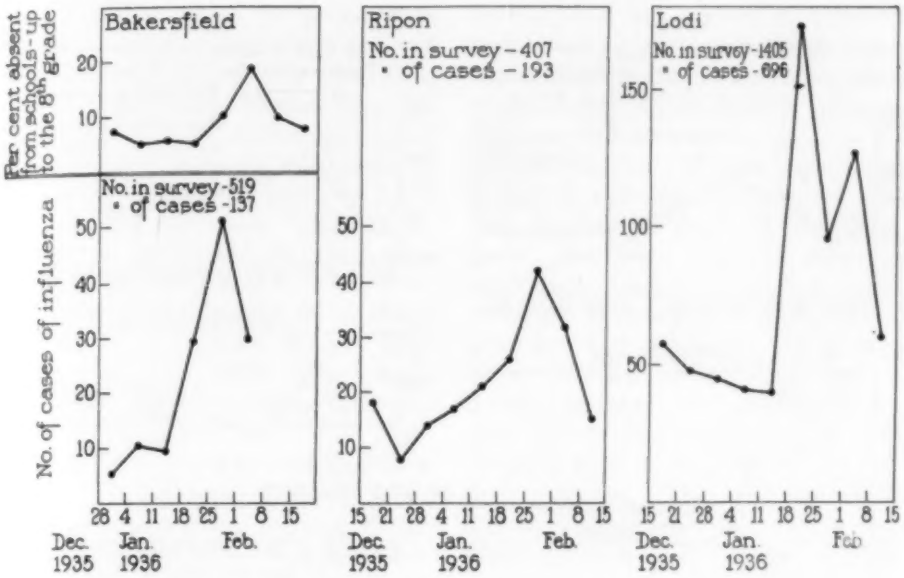
During February and March, 1936, a widespread incidence of acute respiratory disease, diagnosed as influenza, occurred in the United States and Canada. It was first called to our attention by Dr. J. J. Sippy of Stockton, Calif. Through the kindness of the state and local health authorities of California, it was possible to study the disease directly. The illness as observed appeared to be typical influenza; the onset was sudden with chills and fever, headache, generalized aches and pains, nasal and pharyngeal irritation without pronounced coryza. In most instances the fever was of 3 days' duration, although a brief secondary rise on the 5th day was not uncommon. Nausea and vomiting were not commonly observed. Hoarseness and cough not infrequently began at the time the temperature reached normal and persisted for an indefinite period. A small proportion of cases, in adults primarily, developed a mild bronchitis or bronchopneumonia with tenacious yellow sputum. Physical examination usually revealed nothing except the flushed face and a rather dry pharynx with swollen lymphoid follicles but without exudate. Muscular tenderness was frequently evident. Temperatures ranged up to 104° F. Convalescence was commonly associated with a protracted weakness and depression. The leukocyte counts regardless of the day of disease averaged about 6,000 per cu. mm. Figure I.

FIGURE I



While the outbreak was first recognized and reported in Ripon, San Joaquin County, physicians there recalled that cases of a similar nature had been occurring in neighboring towns to the south for some time before it became prevalent in that locality. In fact, as early as January 1, 1936, we had been informed that influenza was prevalent in the southern portion of the state and in the northern counties as well. But it appears certain that extensive involvement of the population did not take place much before the middle of January. From the vicinity of Ripon the disease extended rapidly throughout the San Joaquin Valley and into the coastal area. The disease affected children of school age to such an extent that the closing of schools due to the lack of attendance was frequently necessary. Since the disease was usually uncomplicated, physicians were not called to see many of the cases and consequently the reporting was grossly inaccurate. In an attempt to obtain data, house-to-house surveys were made in 3 districts. In Ripon, a rural village of 600 inhabitants, and in Lodi, a town of 6,000, rather extensive surveys including 407 and 1,405 individuals, respectively, were made by Dr. P. W. Covington after the epidemic had definitely waned. In Bakersfield, a city of 50,000 population, 500 persons were

FIGURE II



included in a canvass made after the peak of the epidemic but while many new cases were still occurring. While the data may be open to certain errors, they serve to illustrate the time of onset and rapidity of the outbreak, the case incidence and the age incidence observed in the individuals questioned. A sufficient number of cases were seen to feel certain that the major form of illness was the same in all districts. Figure II and Table I show the number of cases and the time of onset, (Figure II) the age incidence, and the percentage of the total cases occurring in different age groups in relation to the percentage of the total number of individuals belonging to those age groups (Table I).

In Ripon the number of cases of respiratory disease increased gradually each week from the first of January until the peak was reached the week of January 25, when 42 of the 193 cases in the 2 month period ending February 15, occurred. Two weeks after the peak the curve again reached normal. The gradual increase in cases may possibly be significant in view of the fact that the disease was first recognized as of epidemic proportions in this locality.

In Lodi, on the other hand, the outbreak was explosive with its height of 173 cases in the 1st week, February 18–25, and lasting 3 weeks. In Bakersfield the epidemic began abruptly at the same time as that in Lodi but

TABLE I

Case Incidence and Age Incidence in California Outbreak of Respiratory Disease

	Below 20 Years of Age			*Above 20 Years of Age*			
Town	*Per Cent of Population*	*Per Cent of Total Cases*	*Age Incidence*	*Per Cent of Population*	*Per Cent of Total Cases*	*Age Incidence*	*General Incidence*
Ripon	36.2	52.7	59.4	63.8	47.3	30.5	41.0
Lodi	32.8	41.5	41.2	67.2	58.4	28.1	32.2
Bakersfield	34.2	55.0	55.0	65.8	45.0	24.0	34.8

FIGURE III

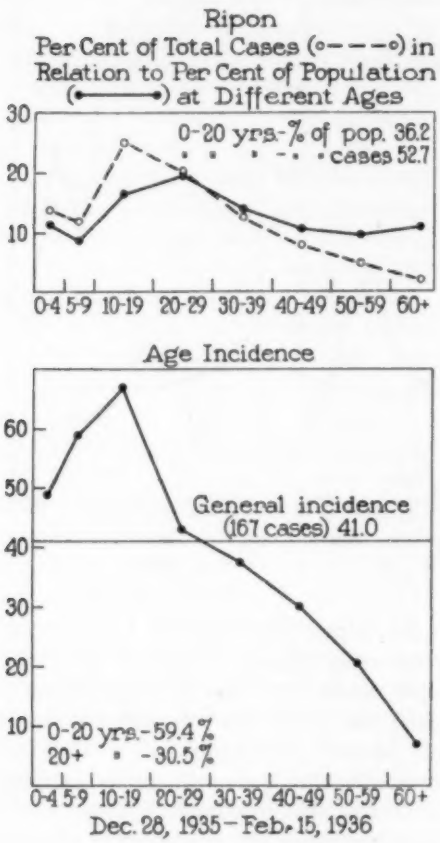

Ripon
Per Cent of Total Cases (o- - -o) in Relation to Per Cent of Population (•——•) at Different Ages
0-20 yrs.-% of pop. 36.2
cases 52.7
0-4 5-9 10-19 20-29 30-39 40-49 50-59 60+
Age Incidence
General incidence (167 cases) 41.0
0-20 yrs.-59.4%
20+ -30.5%
Dec. 28, 1935—Feb. 15, 1936

FIGURE IV

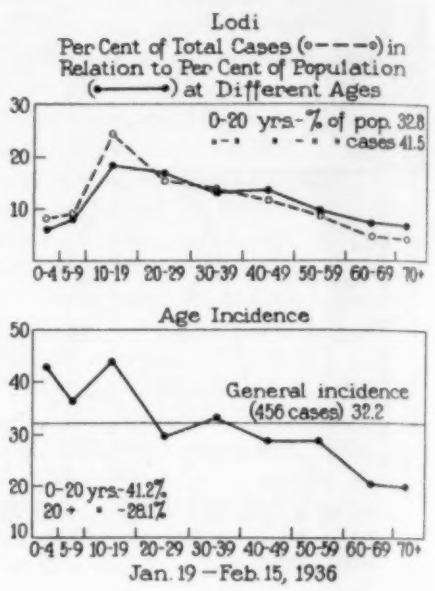
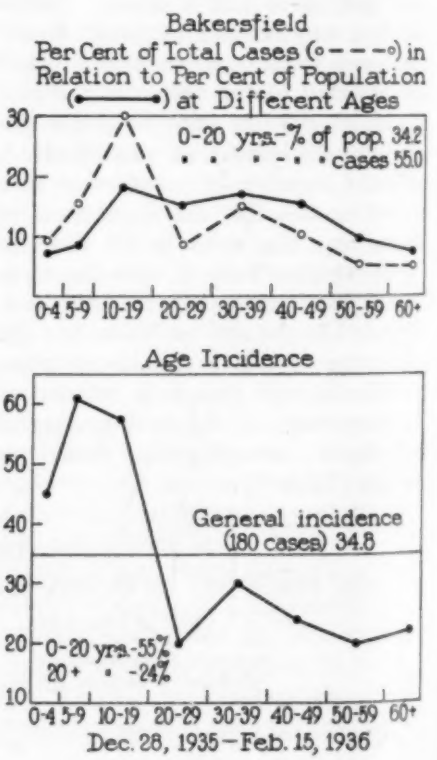

Lodi
Per Cent of Total Cases (o- - -o) in Relation to Per Cent of Population (•——•) at Different Ages
0-20 yrs.-% of pop. 32.8
cases 41.5
0-4 5-9 10-19 20-29 30-39 40-49 50-59 60-69 70+
Age Incidence
General incidence (456 cases) 32.2
0-20 yrs.-41.2%
20+ -28.1%
Jan. 19—Feb. 15, 1936

FIGURE V


Bakersfield
Per Cent of Total Cases (o- - -o) in Relation to Per Cent of Population (•——•) at Different Ages
0-20 yrs.-% of pop. 34.2
cases 55.0
0-4 5-9 10-19 20-29 30-39 40-49 50-59 60+
Age Incidence
General incidence (180 cases) 34.8
0-20 yrs.-55%
20+ -24%
Dec. 28, 1935—Feb. 15, 1936

reached its height, as in Ripon, the last week in January. It declined the following week but its duration is not known, although the school attendance did not return essentially to normal until the 3rd week in February.

In each locality the age incidence tends to follow the same curve. The population below 20 years of age was most severely affected. The general incidence in the 3 communities was: Ripon 41.0 per cent (Figure III), Lodi 32.2 per cent (Figure IV), Bakersfield 34.8 per cent (Figure V). While individuals below the age of 20 constituted about one-third of the population, the percentage of cases occurring in this age group was 52.7, 41.5, and 55.0, with an age incidence of 59.4. 41.5, and 55.0

per cent, respectively. Above the age of 20, however, which group comprises two-thirds of the population, the age incidence of cases was only 30.5, 28.1, and 24.0 per cent, respectively. In Bakersfield this is further shown by the fact that during the third week of the outbreak almost one-fifth of 5,292 enrolled children from kindergarten through the 8th grade of school were absent because of illness.

We witnessed, therefore, an explosive outbreak of respiratory disease diagnosed as influenza which affected most severely the youngest third of the population.

Throat washings were obtained from 47 cases. These were mixed with equal parts of glycerine and shipped by air express to the laboratories of the International Health Division in New York. There ferrets and mice were inoculated with 33 samples, and filtrates of the material were introduced into tissue culture medium. In no instance was influenza virus recovered. Furthermore, serum was obtained from 32 of the patients during the acute stage, from 28 of the same individuals 2 weeks after recovery and from 12 of them again 4 weeks after recovery.

These sera were tested against P.R. 8 virus in mouse protection tests. In all but 1 case the convalescent serum failed to show an increase in antibodies to human influenza virus. The acute and convalescent sera from 10 patients were also tested aginst swine influenza virus. No differences between neutralizing capacity of the acute and convalescent sera was detectable.

We are faced then with an epidemic of what was clinically and epidemiologically influenza in which attempts to isolate a virus were unsuccessful. The general nature of the outbreak was very suspicious of a virus disease. Several explanations may be offered for the failure. It may be that the virus was of low virulence and failed to infect ferrets. This is suggested by the facts that in some instances the first-passage ferret exhibited a mild elevation of temperature but on subsequent passages the temperature reaction became less and less definite. On the other hand, it may be that the conditions of shipping resulted in death of the active agent. We have, however, recovered virus from similar material in other outbreaks as late as 3 weeks after its collection and shipment. The failure of the convalescent sera to exhibit any increase in neutralizing antibodies suggests that if the causative agent were influenza virus, it was of very low antigenic property. The most likely conclusion, on the basis of the present knowledge at least, is that the epidemic was caused by an entirely different virus.

If this be the case, it is evident that the term "influenza" embraces more than a single etiological entity and that continued efforts must be made to isolate the etiologic agents and to differentiate such clinically similar but etiologically different diseases. It may be, however, that the results can still be attributed to a peculiarity of a strain of influenza virus of extremely low pathogenicity for experimental animals, capable in humans of infecting only superficially without eliciting a demonstrable increase in circulating antibodies.

POSSIBILITY OF THERAPEUTIC AND PREVENTIVE MEASURES

The discussion so far has dealt primarily with the general development of our knowledge of influenza virus. But what are the possibilities of the application of this information to the treatment and prevention of the disease? Such a question in view of the limited knowledge of the disease and clinically similar infections seems a bit premature. Nevertheless, certain steps have been taken along this line. In most

virus diseases the use of immune serum has not been efficacious in therapy. On the other hand, as a preventive measure, as for example in measles, immune serum if administered during the incubation period exerts a distinct effect in preventing or modifying the disease. The British workers [36] have produced a hyperimmune horse serum which in mice has been shown to be effective prophylactically when administered intranasally as much as 24 hours before the virus. When given 24–72 hours after the virus had been administered, a decrease in mortality was observed, although the incidence of infection was apparently unchanged. The difficulty of serum treatment in the ordinary mild epidemics of influenza is obvious. Many patients are not seen until the second day and the majority recover on the 3rd or 4th day. In the presence of a severe outbreak, the use of a serum as a prophylactic or therapeutic measure might, however, be of considerable value.

Our attention has been directed rather to the possibility of effective vaccination as a preventive measure.[37, 38] Because of the efficacy of vaccination with active virus in experimental animals without concomitant evidence of infection, it appeared that similar procedures might be applicable to the human population. Furthermore, the successful cultivation of the virus in tissue culture offered a source of virus free from the disadvantages which accompany the use of fresh animal tissue.

From a group of human volunteers those whose serum possessed the least neutralizing capacity were selected. Tissue culture virus was administered subcutaneously in 3 to 4 doses of 0.5 to 2.0 c.c. at weekly intervals. No clinical evidence of infection or of untoward reaction was observed. Eight subjects were given the virus intradermally in 3 doses of 0.5 c.c. each at weekly intervals. Bleedings were taken before the first vaccinating dose, before each subsequent inoculation, and 10 days, 2 months, and 5 months after the final injection. In each case a sharp rise of the circulating antibodies, as measured against mouse-passage influenza virus, occurred following vaccination.

The mean titer of the serum in the group vaccinated subcutaneously was about 1:4 before vaccination and increased approximately tenfold to a mean titer of 1:40. This level is maintained with little change for 2 months, but after 5 months some decline of the titer has usually begun. A similar tendency for the antibody titer to decline was observed in the serum of influenza convalescents 5 months after the disease. Variations in the individual response are inevitable, but the impression is gained that those subjects whose serum contained the least antibody before vaccination showed the greatest increase following vaccination.

Thus it is seen that active influenza virus derived from tissue culture has been given to normal human subjects without causing infection. In fact, 2 subjects were vaccinated at the time they were suffering from colds; no exacerbation of symptoms was noted. To one individual a single dose of 3 c.c. of virus was given subcutaneously. Two days later throat washings from this individual were inoculated into a normal ferret. The animal developed no signs of infection and its serum taken 2 weeks later contained no antibodies. There was no evidence, therefore, that the virus given subcutaneously had found its way into the respiratory tract of the human individual. Nevertheless, a prompt rise in circulating antibodies occurred.

Stokes and his associates [39] have reported the subcutaneous inoculation of human volunteers with active virus in

the form of filtrates of infected mouse lungs. Here again no evidence of respiratory infection followed, but increase in circulating antibodies did occur.

While it is impossible as yet to interpret the immunity measured by protective antibodies in the serum in the terms of actual immunity to infection, it seems likely on the basis of results in experimental animals that the increase in humoral immunity will result in an increased resistance to the natural disease. The efficacy of vaccination in this direction can be determined only by more extensive application and study. If only a decrease in severity of infection and elimination of pulmonary complications could be effected, a distinct step forward will have been made.

It is clearly evident that since the isolation of a filterable virus from human influenza, a distinct progress has been made. The distribution of the virus, the problem of immunity to the disease, the relation of current influenza to the common cold, pandemic influenza, and other similar infections have all been approached through experimental methods. Moreover, fundamental aspects of prevention and therapy have been investigated. Nevertheless, the knowledge is of necessity incomplete. Diagnostic aids adaptable to general use, simple tests available for widespread immunity studies without large supplies of animals are still wanting. In short, the preliminary skirmishes have been very promising but the campaign is far from complete.

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Observations on the Use of Copper and Chloramines in Water Purification*

A. E. GRIFFIN

Research Laboratory, Wallace & Tiernan Co., Inc., Newark, N. J.

THE present many uses of the ammonia-chlorine process naturally did not develop over night. As long ago as 1904 the suggestion was made that a combination of chlorine and ammonia should have considerable value in the treatment of water. The idea did not seem to receive much consideration until about 1930 when we find 5 communities in the United States using the process. Since then, the popularity of the process has spread until now nearly 1,000 communities are using it.

In 1930, many water works officials were faced with serious taste problems in their water supplies, caused by increasing concentrations of phenolic bodies in the raw water which united with the chlorine used for sterilization to form extremely ill-smelling and tasting chlorophenols. About the same time it was demonstrated that if ammonia were applied ahead of the chlorine where such conditions prevailed, the production of the chlorophenolic tastes would be greatly minimized. Simultaneously with these developments, strenuous efforts were being made to keep the offending pollution out of the various bodies of water used for domestic supplies. As a result, many of the sources of pollution were located and eliminated so that gradually the pressing need for ammonia in preventing chlorophenolic tastes passed. But the ammonia-chlorine process was not abandoned with the passing of its original need, for it was noted at many places that other benefits, some even transcending the original purpose, such as lowered bacterial counts, less algae in distributing reservoirs, better tasting water, etc., were being obtained. These findings stimulated research and accurate observation of the effect of the process to such an extent that today we find the process being widely used to control the growth of iron bacteria, to prevent the accumulation of slime, to maintain pipe line capacities, to retard corrosion, to lessen "red water" troubles, particularly at dead ends, and to prevent aftergrowths in distribution mains and reservoirs. These benefits were all made possible by the one outstanding and tremendously important characteristic of ammonia—namely, its ability to combine with chlorine in such a way as to make it possible to maintain a residual over a period of time without the production of chlorinous tastes and odors.

When the chloramine process was first proposed, it was felt that ammonia should always be added ahead of chlorine and that the ratio should remain very close to 1:3. For a time these

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admittedly arbitrary rules were followed quite closely but as the process developed it was demonstrated time and again that deviations from the accepted manner and ratio of application frequently improved the working of the process. In addition, studies of the character of the water, its reaction to ammonia and chlorine, together with the fate of the ammonia in its passage through a water works system, indicated that a thorough knowledge of the factors involved should increase the useful scope of the process.

ORDER OF APPLICATION

From the very beginning, the order of application of ammonia to chlorine has been of utmost importance. At the time, when disturbances due to the presence of phenols were at their height, it was imperative that the ammonia be added first in order to prevent the formation of the offensive chlorophenols which were capable of producing such persistent odors and tastes in a water system. As a result, this order of application became so ingrained in the public mind that even today there are many who feel dire consequences will follow if the order of application is reversed. Modern practice, however, indicates that there are times when the order of application may be reversed to very good advantage. This is particularly true where it is desired to kill the bacteria as quickly as possible and at the same time produce a persistent residual. By adding chlorine first, all the quick effects of chlorination alone may be obtained with the added advantage of a residual which will reach well out into the mains. True, this order of application where chlorine comes first may use more chlorine than the reverse, but on the other hand a considerable saving in ammonia will be effected.

An outstanding example of the chlorine first, ammonia second, order of application is at Wanaque, N. J., where ammoniation is practised during the spring and fall turnover periods. At this plant, chlorine is automatically applied just below the master Venturi tube in amounts proportional to the flow of the water and in sufficient quantities to produce a residual ranging from 0.20 to 0.30 p.p.m. after ½ hour's contact. As these turnover periods approach, ammonia is added at a point below the point of chlorine application where there is every assurance that the greater portion of the immediate chlorine demand will have taken place. By this method of application quick sterilization is effected, at least some of the organic tastes and odors are oxidized by the slight excess of chlorine, and a persistent residual is produced—all at a considerable saving in ammonia.

RATIO OF AMMONIA TO CHLORINE

Experience has taught that the most practical ratio of ammonia to chlorine is 1:3, but research seems to indicate that deviation from this ratio is often desirable, depending upon the ends sought. Therefore, no hard and fast rule can be given for any single ratio of ammonia and chlorine which will be equally good under all circumstances. The best that can be done is to advise that under ideal conditions, approximately 1 part of ammonia will unite with 4 parts of chlorine at pH 8.4 to form monochloramine and that at pH 4.8 — 1 part of ammonia will unite with 8 parts of chlorine to form dichloramine. In practice, however, where ideal conditions are seldom found, experience has indicated that somewhat more ammonia should be used than the reactions show. An exception to this rule might very conceivably occur in an industrial plant where it has become desirable to apply ammonia and chlorine to a water of high pH

but which is expected to become acid shortly after the addition of the chemicals. Under these conditions a low dose of ammonia in relation to chlorine would be advisable in order to prevent the production of an excess of ammonia in the acid portion of the system.

That the sterilizing action of the chloramines is somewhat slower than of chlorine alone is generally recognized. It has likewise become fairly well established that a chloramine residual twice the value of a chlorine residual will accomplish the same bacterial kill under the same conditions with the same period of contact using ammonia-chlorine ratios somewhere around 1:3 or 1:4 on waters ranging in pH from 6.8 to 7.5.

Thus it would seem wise to consider this knowledge as a starting point for better operation; for a more flexible plant capable of meeting changing water conditions; for the production of better tasting water; and for the delivery of a water free not only from organisms of the coli-aerogenes group but from all lactose broth gas formers. True, physical conditions at many places will militate against utilization of the full benefits capable of being derived from a judicious use of chlorine and the ammonia-chlorine process. However, a full understanding of the knowledge available will go a long way toward the delivery of a "perfect water."

It would appear that the following current operating experiences illustrate what may be accomplished by a close observation of details. At Poughkeepsie, N. Y., aftergrowths have appeared regularly in the distributing reservoirs each summer for several years. Repeated attempts had been made to carry residuals into these reservoirs with chlorine alone without much success, due to the production of chlorinous tastes as soon as residuals were increased sufficiently to penetrate into the system for any appreciable distance. Early in the summer of 1936 experiments were inaugurated to test the ability of ammonia to carry a residual to these reservoirs. Within a very short time, it was decided that a 1:3 ammonia to chlorine ratio would produce the desired results at a minimum expenditure for chemicals. The accuracy of the preliminary work is evidenced by the fact that within a week after the process was installed a residual of 0.10 p.p.m. appeared at the reservoir, while at the same time the troublesome aftergrowths disappeared.

At Bound Brook, N. J., ammonia and chlorine have been applied continously to the raw water since the completion of the plant in 1931. Ammonia-chlorine ratios have been maintained very close to 1:3. This ratio of operation together with excellent water conditioning and floc formation, has resulted in a coli-aerogenes index on top of the filters of close to 3.0 per 100 c.c. In an effort to bring about some improvement in operation during the summer of 1936, it was decided to try the effect of an ammonia-chlorine ratio of approximately 1:6. At this time the index was running very close to the figure given above, and occasional gas forming bacteria were passing through the filters. Within a week after the inauguration of the new ratio, the index on the top of the filters had dropped to around 0.3 and the passage of gas forming bacteria through the filters had practically ceased. These conditions have prevailed all through the summer and up to October 1. This improvement cannot be attributed to improvement in the raw water for there has been little change in its quality during the entire summer but it can be attributed to the change in the ammonia-chlorine ratio.

In addition to these experiences, the

case at High Bridge, N. J., is worthy of note. The supply is a small one of some 200,000 g.p.d. The water is unfiltered and feeds by gravity directly to the consumers from a concrete lined service reservoir of some 750,000 gal. capacity. Chlorine and ammonia had been applied to the inlet of this reservoir in quantities sufficient to give a residual of at least 0.20 p.p.m. at the outlet. In spite of these precautions an unduly large number of the samples collected for bacteriological analyses contained gas forming organisms. After several weeks of experimenting with varying doses, it was finally found that these bacteria could be kept under control by applying the ammonia-chlorine in a ratio of around 1:12. This meant using nearly 3 times the amount of chlorine and about half the quantity of ammonia formerly used.

These 3 examples of ratios varying from 1:3 to 1:12 indicate that the ammonia-chlorine ratio should be carefully studied in order to secure the full benefits of the process.

REFORMATION OF CHLORAMINES

As stable as chloramines are they cannot under ordinary circumstances be expected to retain their chlorine forever. However, there is no reason why chloramines cannot be reformed by adding more chlorine to combine with the remaining ammonia. If this procedure is followed it will be necessary to determine the amount of ammonia still present since the application of more chlorine without sufficient ammonia to form chloramines is almost certain to produce a taste. The test for ammonia while not as simple as that for chlorine, can be made by following the directions given in the A.P.H.A. *Standard Methods of Water Analysis*.

Reformation of chloramine may be particularly valuable where it is desired to carry a residual through long service aqueducts or through balancing or service reservoirs. Under these circumstances, ammonia and chlorine would be applied near the intake and a secondary dose of chlorine at a point where the residual had become either too weak to be effective or had disappeared altogether.

Morristown, N. J., is already using this technic in order to eliminate bothersome aftergrowths which have periodically appeared in one of their service reservoirs.

At Bound Brook, N. J., it has long been the practice to reform chloramines in the filtered water by adding enough chlorine to the water in the clear well to combine with the ammonia coming through the filters. Taking a specific instance—on July 29, 1936, 0.202 p.p.m. free ammonia, as determined by the distillation method, was left in the water after filtration. At this point 0.30 p.p.m. of chlorine was then added which resulted in a chloramine residual of 0.20 p.p.m. as the water left the plant.

At Poughkeepsie, N. Y., tests indicated that all but 0.007 p.p.m. of the ammonia added to the raw water had been removed by filtration. Thus when chlorine was added to the filtered water there was no hope of reformation of chloramines making it necessary to apply a secondary dose of ammonia to accomplish the desired results.

AMMONIA DEMAND

The factors affecting the ammonia demand are somewhat vague due primarily to lack of data. From the small amount of work done it appears that the question is not a simple one for both bacterial and algal activity are involved. From the limited knowledge available, it appears that the loss of ammonia may be appreciable if applied too far ahead of the chlorine, but that if applied not more than a few minutes

ahead in all probability the loss will be negligible. For example, at Bound Brook, N. J., when ammonia is applied ½ hour or more ahead of the chlorine, nearly 50 per cent is lost, but little loss appears where there is a contact of only a few minutes. Table I illustrates the latter point.

TABLE I

Place	*Total NH_3 Present at Start p.p.m.*	*Total NH_3 Recovered by Test Approx. 10 Min. Later p.p.m.*
Burlington, Vt.	0.139	0.132
Poughkeepsie, N. Y.	0.247	0.251
Bound Brook, N. J.	0.349	0.375

In this table the total ammonia present at the start is the amount of free ammonia found in the raw water plus the amount added. In two cases it is to be noted that more ammonia was recovered than was present at the start. This is probably due either to slight irregularities in the water flow reading or to inherent errors in the test. Whatever the cause, the results have been interpreted to indicate no loss of ammonia within the time limit of the test.

REMOVAL OF AMMONIA THROUGH FILTRATION

The only way to determine how much ammonia a filter will remove is to test for ammonia on both influent and effluent. Some filters will remove nearly all, others very little. In some cases the loss can be accounted for by an increase in nitrites. At Detroit and at one or two other places, much of the ammonia was turned into nitrites in its passage through the filters whereas at Poughkeepsie, where 97.2 per cent removal was effected in the passage of the water through the filters, there was little increase in either nitrites or nitrates.

Table II indicates the range of ammonia removal through various filter sands.

Many factors enter to account for these differences of removal but will not be explained here because the purpose of these figures is simply to show that different filters will remove varying amounts of ammonia.

Practically all surface and many well waters contain some free ammonia. While analyses of its concentration have been made for years at scores of plants, the results have more often been used as an index of pollution than as a guide toward the application of chlorine and ammonia for the formation of chloramines. To an operator who is endeavoring to deliver a water of uniform quality in the most economical way, the free ammonia content in the raw water may be of utmost importance. This would be particularly true of waters in industrial districts. In the Pittsburgh area industrial pollution has sometimes raised the free ammonia content well above 1.00 p.p.m., or enough to take care of as much as 10.00 p.p.m. chlorine.

Since the ammonia content differs from day to day, it is obvious that ammonia-chlorine ratio will also differ even though additional NH_3 is applied

TABLE II

AMOUNT OF NH_3 REMOVED BY FILTER SAND

Place	*Date*	*P.P.M. NH_3 Top of Filter*	*Clear Well*	*Per Cent Removal*
Burlington, Vt.	8/ 4/36	0.012	0.012	0
Bound Brook, N. J.	7/29/36	0.375	0.202	46.1
Poughkeepsie, N. Y.	7/17/36	0 251	0.007	97.2

at a constant rate. These shifting ratios may be responsible for some of the tastes which appear at irregular intervals. This was illustrated by a search of the operating records of the Bound Brook, N. J., Filtration Plant of the Elizabethtown Water Company, where regular free ammonia determinations have been made since 1931. For the sake of brevity, only two or three results have been selected from the hundreds available. On March 1, 1934, the free ammonia in the raw water amounted to 0.253 p.p.m. At that time 0.22 p.p.m. was added, making a total of 0.473 p.p.m. A few days later the free ammonia in the raw water had dropped to 0.007 p.p.m., while the ammonia application was left unchanged. This change meant that on the second day there was a total of only 0.217 p.p.m. ammonia present to combine with the chlorine, or a reduction of over 50 per cent. Assuming that the ratios prevailing on the first day were correct, then the ratios on the second day were incorrect, thereby setting up conditions favorable for the production of tastes and odors. However, as soon as this deficiency was noted by the operator, the ammonia dose was raised to around 0.42 p.p.m. or enough to restore the chemicals to their former ratio.

It is felt that the wide fluctuation of the natural ammonia content of the untreated water within such a short period of time as occurred at Bound Brook is the exception rather than the rule, particularly on impounded waters, but on the other hand, there is little doubt that the ammonia content of even impounded water does change from season to season and must be watched if trouble is to be avoided.

Thus it appears that in order to secure full benefit from the process, the ammonia-chlorine ratios should be based on the total free ammonia present rather than on the amount of ammonia added.

CHLORINE-AMMONIA COPPER SULPHATE

It has been recognized for years that the ammonia-chlorine process will very successfully control algæ growths. A striking example of this characteristic is reported from East Aurora, N. Y., where the operator reported that prior to the summer of 1935 the annual cleaning of the service reservoir yielded 2 truck loads of material consisting largely of dead algæ whereas the cleanings of the last 2 summers, after the adoption of the ammonia-chlorine process, have yielded less than 2 wheelbarrow loads.

On the other hand, a few reports have been received from various parts of the country that there are some forms of algæ which appear to grow and flourish in the presence of chlorine or chloramine residuals. The few samples of such algæ received in our laboratory have in nearly every instance proved to be small green spherical forms each neatly encased in a jelly-like sheath. In nearly every case these have been reported as growing particularly well along concrete walls of reservoirs and swimming pools. Treatment with intermittent doses of copper sulphate has usually inhibited their growth but seldom stopped it entirely. Major Harold, in his 1935 *Metropolitan Water Board Report* (London, England), said he had found where copper sulphate, ammonia, and chlorine were continuously applied to water a compound called cuprichloramine was formed which was more effective as an algacide than chloramine alone. This seems logical, for such a combination should tend to hold the copper ion in solution over a reasonably long time without the formation of the quick settling copper carbonate. Whether or not any cuprichloramine was formed at High Bridge, N. J., where the process was used during the past summer, is open to question, but there is no doubt that all of the algæ present in the reservoir died soon after the treatment

was started. In this case, a solution of copper sulphate was fed directly into the intake at a rate of 3 lb. per day to an average flow of 200,000 g.p.d. (0.26 p.p.m.) through a Wallace & Tiernan Chloro Clock. One of the main advantages of adding copper sulphate in this manner is that the copper ions come in contact with all of the water going into the system, thereby making small doses very economical. Accurate control of the application either by gravity or against pressure insures maximum control of the algæ at a minimum cost.

SUMMARY

There can be little doubt that the ammonia-chlorine process has proved its worth as evidenced by the large number of communities using it. In the majority of cases excellent results have been obtained, although there have been occasional installations where the benefits have been somewhat disappointing. In the light of present knowledge, it appears that many of the installations now considered as working well could be improved by a thorough check on all the factors involved, and those few now considered to be yielding little or no benefit could be put on an efficient basis. Finally, there is little doubt that the adoption of the process by many other plants would materially lessen the worries due to bacterial aftergrowths, red water, pipe line capacity loss, iron bacteria, tuberculation, and tastes and odors.

Careful regard to all details and thorough studies into the theories underlying the process will inevitably disclose many new advantages not even dreamed of now. Continued studies of the process will, in addition, take much of the guesswork out of the present methods of application.

CONCLUSIONS

It is concluded from these observations that—

1. Ammonia may be applied either before or after the chlorine, depending upon conditions.
2. The ratio of ammonia to chlorine can be varied over a wide range.
3. Chloramines may be reformed by an additional dose of chlorine to a water which has already supported a chloramine residual. This depends upon the amount of ammonia left in the water at the desired point of secondary chlorination.
4. The free ammonia naturally present in the raw water may greatly influence the proper dose of ammonia necessary for the formation of chloramines.
5. Close attention to the amount of free ammonia naturally present may avoid operating difficulties such as tastes, etc., and other periodic irregularities in the quality of the delivered water.
6. The removal of ammonia by filters depends on the filter. The per cent removal may range from 0 to nearly 100 per cent.
7. Chloramines are generally very effective in controlling algal growths. However, resistant growths not easily controlled by chloramines may be held in check by a carefully controlled continuous feed of copper sulphate applied ahead of the ammonia and chlorine point of application. The success of this method depends upon the close adjustment of the copper sulphate feed to both the ammonia and chlorine feeds.
8. Proper attention to detail including the determination of free ammonia will greatly improve the efficiency of an already efficient water works tool.

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Carrier-Borne Typhoid Fever in New York State

With Special Reference to Attack Rates Among Household Contacts

ERNEST L. STEBBINS, M.D., F.A.P.H.A., AND ELIZABETH REED

Division of Communicable Diseases, New York State Department of Health, Albany, N. Y.

THE first typhoid carrier was discovered in New York State in 1911. Since that time there has been an increasing effort to detect carriers through the various means available, and a system of control of known chronic typhoid carriers has been put into effect. A chronic typhoid carrier has been defined for administrative purposes as a person in whose secretions or excretions typhoid bacilli have been found, but who has not suffered from typhoid fever within the year previous. On January 1, 1936, 570 typhoid carriers had been declared in the state.*

The discovery of these carriers has been accomplished by several different methods. As shown in Table I, they are in the order of importance: (1) by epidemiological investigation of sporadic cases of typhoid fever; (2) by the requirement of negative specimens for the release of all recovered cases; (3) by routine examination of fecal and urine specimens from food handlers; and (4) accidentally by routine examination of fecal or urine specimens from patients suffering from other illnesses, and by the culturing of operative specimens, especially of the gall bladder.

The epidemiological investigation of sporadic cases of typhoid fever has proved to be a most effective method of discovering carriers. This method has resulted in the discovery of 72 per cent of all known chronic typhoid carriers. With the decreasing incidence of typhoid fever, there is a greater opportunity for more exhaustive study of each case, and the ratio of cases reported to carriers discovered indicates an increasing effi-

TABLE I

Distribution of Declared Chronic Typhoid Carriers in New York State (1911-1935) According to Method of Discovery*

Method of Discovery	*Number*	*Per Cent*
Epidemiological investigation	370	72.4
Requirement of specimens for release of cases	101	19.8
Routine examination of food handlers	13	2.5
Accidental †	27	5.3
Total	511	100.0

* Exclusive of New York City and State Institutions.

† By routine examination of fecal or urine specimens from patients suffering from other conditions, and by the culturing of operative specimens, especially of the gall bladder.

* Exclusive of New York City.

TABLE II

Chronic Typhoid Carriers Discovered in New York State by the Requirement of Release Specimens Following Recovery*

Year	Number of Recovered Cases	Number of Chronic Carriers Discovered by Release Cultures	Per Cent of Recovered Cases Found to Become Chronic Carriers
1911–1928	39,074	39	0.1
1929	523	7	1.3
1930	596	12	2.0
1931	472	15	3.2
1932	431	9	2.1
1933	378	6	1.6
1934	304	12	3.9
Average per cent, 1930–34			2.5

* Exclusive of New York City and State Institutions.

ciency in this method. In 1929, the ratio of cases reported to carriers discovered was 22–1; while in 1935, this ratio was 8–1.

The detection of carriers following recovery from typhoid fever by means of requirements as to the submission of specimens for bacteriological examination for release, depends largely on the rigidity of the requirements. Previous to 1929, no release cultures were required in New York State except from individuals regularly engaged in food handling occupations. Since 1929, however, cases of typhoid fever have not been released from supervision and restriction until clinical recovery and until 2 successive specimens of feces obtained not less than 3 weeks after onset, and at intervals of not less than 5 days, have been found free from the causative organisms. Individuals continuing to excrete *Bacillus typhosus* for a period of 1 year following the onset of typhoid fever are declared chronic typhoid carriers.

Table II shows the proportion of recovered cases found to have become chronic carriers during the period from 1911 through 1928 and by individual years through 1934. Since 1929 release requirements have been rigidly enforced, and during recent years additional specimens have been requested if the individual continued to excrete the organism during convalescence. That these requirements failed to detect all of the chronic typhoid carriers developing during this period, is evidenced by the fact that at least 7 of the cases having onset of typhoid fever in the period 1929–1934 and who were released after submission of the required number of negative specimens, subsequently caused cases of typhoid fever and have been discovered to be chronic typhoid carriers by means of epidemiological investigation of these cases.

The number of typhoid carriers discovered by means of routine examination of specimens of urine and feces obtained from food handlers has been so small that it has not been considered sufficient to justify this method of detection of typhoid carriers.

At the time of the discovery of each carrier a careful history of the individual's experience with typhoid fever has been obtained. This history includes information concerning date of birth, sex, color, occupation of the carrier, the date on which this particular individual suffered from typhoid fever, and the circumstances under which the carrier condition was discovered. Cases of typhoid fever, probably due to the carrier previous to discovery are listed with information as to age, sex, association with the carrier, and the probable vehicle of infection. Previous residence and previous occupations of the carrier are listed from the time of the probable beginning of the carrier condition. Members of the household of the carrier are recorded with information as to age, relationship to the carrier, history of typhoid fever, or immunization against typhoid fever. Any cases subsequently attributed to the carrier are entered

upon the carrier history. An analysis has been made of the information contained in these histories to determine the relative efficiency of the various methods of detection of the chronic carrier condition, and to evaluate the various factors influencing the dissemination of typhoid infection by the carrier.

In an attempt to obtain information concerning the effect of continued exposure to a typhoid carrier, on January 1, 1936, a survey was made of as many households of existing carriers as possible. This survey was made by health officers at the time of the routine quarterly visit to all known carriers, and included name, age, sex, and relationship to the carrier of all household contacts resident in the household since the carrier had typhoid fever. (It is of interest to note that exclusive of carriers discovered through the follow-up of cases, 20 per cent gave no history of clinical typhoid fever.) Information was also obtained as to the period of residence in the household for each contact from the date of entry into the household to the date of withdrawal from the household. The date of onset of typhoid fever and dates of vaccinations against typhoid fever were recorded for each contact giving such a history.

CARRIER-BORNE TYPHOID FEVER

The carrier histories and the household survey have been studied in an attempt to determine the effect of exposure to typhoid carriers by means of case carrier ratios and the attack rates among household contacts of carriers. All cases of typhoid fever occurring in the household of a known carrier subsequent to the year of his illness have been considered as due to that carrier, except those cases occurring in the household in the same calendar year as the carrier's own illness, which were considered rather as associated with the acute illness.

In order to measure the degree of risk experienced by household contacts of typhoid carriers, it is necessary to take into consideration the varying periods of time that different individuals have been carriers, and the varying lengths of exposure of contacts to the carrier. This is accomplished by a modification of the life table method, whereby each individual is counted once for each year that he is present in the household for any particular period under consideration.

The risk of household exposure to carriers has been studied with respect to various time scales: (1) chronological age of contacts; (2) "carrier age" of the carrier, a time scale the zero point of which is the year of the carrier's illness, and (3) "exposure age," taking as a zero point the contact's entrance into the household of the carrier.

Table III shows the method of calculation of carrier years experienced by an individual carrier observed in the study, with reference to the time of the discovery of the carrier condition. This individual had typhoid fever in 1910. The carrier condition was discovered in 1925, and he was observed until the close of the study, December 31, 1935. For the purpose of this study, the years 1911 through 1935 were considered. Fourteen years, 1911 through 1924, are

TABLE III

Calculation of Carrier Years for a Carrier

Family No. 108

Carrier's Onset of typhoid, 1910—Discovered, 1925—Study closed 1935

	Carrier Years
Before discovery	14 years
Year of discovery	1 "
After discovery	10 "
Total	25 years

TABLE IV

Calculation of Person Exposure Years for Contacts to Carrier

Family No. 108

Carrier's illness 1910—Date of discovery 1925—Study closed 1935

	Household Contacts to Carrier		
	Period in Household Dates	*Typhoid Vaccine Date*	*History of Typhoid Fever Date*
Contact A	1910–1935	no	1915
Contact B	1920–1935	no	1925
Contact C	1920–1935	1925	no

	Person Exposure Years									
	Before Discovery			*Year of Discovery*			*After Discovery*			
	T	*V*	*O*	*T*	*V*	*O*	*T*	*V*	*O*	*Total*
Contact A	9	..	5	1	..	..	10	..	..	25
Contact B	..	..	4	..	..	1	10	..	..	15
Contact C	..	..	4	..	..	1	..	10	..	15
Total	9	..	13	1	..	2	20	10	..	55

classified as carrier experience before discovery; the year 1925, the year of discovery; and 10 years—1926 through 1935—the period after discovery.

Table IV presents the method of calculation of person exposure years for household contacts of this same carrier. In the consideration of contacts, exposure was studied not only with reference to the year of discovery, but also according to the experience of each contact in relation to history of typhoid fever or history of typhoid vaccination. In the tabulation, the symbol T has been used to indicate exposure in the household of a known typhoid carrier after an attack of typhoid fever. The symbol V indicates exposure after typhoid vaccination. The symbol O indicates exposure of a contact having no known previous immunizing experience.

For example, Contact A was present in the household of family No. 108 for the entire period under consideration, that is, 1910 through 1935. This contact had an attack of typhoid fever in 1915. He, therefore, had 5 years—1910 to 1915—of experience, with no known previous immunizing experience. Five years is recorded under the symbol O before discovery. From 1915 through 1924, the time of the discovery of the carrier, he experienced 9 years' exposure following an attack of typhoid fever. Nine years of experience was, therefore, entered under the symbol T before discovery. The carrier was discovered in 1925, and for Contact A 1 year is recorded as experience during the year of discovery of the carrier, under T, indicating exposure following a previous attack of typhoid fever. This same contact remained under exposure in the household for 10 years after the discovery of the carrier. Therefore, 10 years of experience is recorded under the symbol T after discovery.

Contacts B and C did not enter the household until 1920, 10 years after the beginning of the carrier condition. Carrier B, therefore, is recorded as having 4 years' exposure under symbol O

before discovery, 1 year under the symbol O for the year of discovery, and, since he had typhoid fever during the year of discovery of the carrier, his 10 years of exposure after discovery are recorded under symbol T. Contact C is recorded as having 4 years of exposure before discovery under the symbol O, having had no previous known immunizing experience; similarly, 1 year under the symbol O for the year of discovery. This contact was given typhoid vaccine treatment at the time of the discovery of the carrier. Therefore, 10 years of exposure experience is recorded under the symbol V after discovery.

From this analysis of the experience of each carrier and each carrier's household, tabulations have been made of the total numbers of individuals beginning and ending contact during any particular year. From these, the population per year may be derived for any of the 3 time scales.

Table V shows the actual calculation of exposure years for the first 5 years of "carrier age," for unvaccinated contacts before discovery of the carrier. There were 178 individuals present in the households of carriers at the time of the carrier's illness. During the first year 23 new individuals entered the household and 26 left, leaving 175 under exposure for the second year, and so on, adding and subtracting individuals as they begin or terminate their experience in the household. After having obtained the population, that is, person exposure years for contacts, or carrier years for carriers, rates or ratios may be calculated, charging each case according to year of onset. It must be remembered that 72 per cent of all carriers were discovered because they caused cases. This results in a selected group of families, selected because of the occurrence of cases of typhoid fever. The effect of this selection is seen in Table VI, which shows the attack rates before, at the time of, and after discovery. In an attempt to correct for this element of selection, the year of discovery of the carrier has been excluded in the tabulations of carriers, cases, and contacts, from which attack rates and ratios were derived.

TABLE V

Calculation of Person Exposure Years by Carrier Age for Unvaccinated Contacts Before Discovery

Carrier Age	*Number Entering*	*Number Withdrawn*	*Number Present*
0	178	..	...
1	23	26	178
2	11	28	175
3	14	9	158
4	13	15	163
5	9	21	161
Total 1–5 years			835

TABLE VI

Attack Rates Among Household Contacts of Typhoid Carriers Discovered Through Epidemiological Investigation Before, at the Time of, and After Discovery

	Person Exposure Years	*Number of Cases*	*Rate per 1,000*
Before discovery	5,374	40	7.4
Year of discovery	491	81	165.0
After discovery	2,829	12	4.2

The risk of typhoid fever among household contacts of carriers might be expected to be greater than that of the general population. An attempt has been made to determine the degree of this risk by a study of the incidence of typhoid fever in the households of carriers included in the household survey. Table VII shows the mean annual typhoid morbidity rates in New York State and the attack rates among household contacts of carriers according to age. The greater risk in households of carriers is marked at all ages.

TABLE VII

Mean Annual Typhoid Morbidity Rates in New York State (1928–32) and Attack Rates Among Household Contacts of Carriers*

	Households of Carriers			New York State *		
Age Group	Person Exposure Years	Number of Cases	Rate per 100,000	Population 1930	Number of Cases	Mean Annual Morbidity Rate per 100,000
0–9	2,304	15	651.0	811,613	110	13.6
10–19	2,393	14	585.0	816,144	161	19.7
20–29	1,353	10	739.1	725,476	117	16.1
30 and over	3,192	15	469.9	2,399,172	209	8.7
Total	9,242	54	584.3	4,752,405	597	12.6

* Exclusive of Buffalo, New York City, Rochester, and State Institutions.

Ramsey,[1] in 1935, showed an even greater risk in the household contacts of cases of typhoid fever. Using his data, a comparison may be made of the risk of typhoid fever in household contacts of cases and household contacts of carriers. This comparison is shown in Table VIII by means of a ratio between the number of observed cases of typhoid fever in households of carriers, and in households of cases, and the number of cases expected in these households according to the mean annual morbidity rates in New York State. The ratio in households of carriers is 42–1 and in the households of cases is 1,190–1, the risk in households of cases being 28 times that observed in households of carriers. It seems probable that the actual risk in both carrier and case households is even greater than that shown by these ratios due to the fact that these households include a relatively small proportion of susceptible individuals. In the households of cases 50 per cent of the individuals, and in the households of carriers 30 per cent gave a history either of previous typhoid fever or of typhoid vaccination. In the general population of New York State, the proportion of individuals having had typhoid fever or typhoid vaccination is almost negligible.

Anderson *et al.*[2] have suggested that

TABLE VIII

The Comparative Risk of Typhoid Fever in Household Contacts of Cases, of Carriers, and in the General Population

	Household Contacts of Carriers			Ratio of Observed to Expected * Cases	
Age Group	Person Exposure Years	Number of Cases Observed	Number of Cases Expected	Household Contacts of Carriers	Household Contacts of Cases
0–9	2,304	15	.31	48–1	2,000–1
10–19	2,393	14	.47	30–1	1,120–1
20–29	1,353	10	.22	45–1	790–1
30 and over	3,192	15	.28	53–1	850–1
Total	9,242	54	1.28	42–1	1,190–1

* Based on mean annual morbidity rates New York State (1928–1932) exclusive of Buffalo, New York City, Rochester, and State Institutions

a typhoid carrier infects or immunizes individuals in his immediate environment within a few years, and that subsequent cases develop only if new susceptible individuals are introduced into this environment. Ratios of household cases to carriers by " carrier age " before and after declaration of the carrier as derived from the carrier histories are shown in Table IX. This ratio is higher in the first 10 years after the carrier's illness before declaration than in subsequent years, while after discovery the ratio is relatively constant throughout the entire period. The difference between the ratios of total cases to carriers before and after declaration is statistically significant due entirely to the difference in the first 10 years of " carrier age." It should be mentioned that the accuracy of data obtained as to cases caused by carriers previous to declaration is probably not as great as that obtained for cases caused by carriers subsequent to declaration. It also should be noted that a larger proportion of household contacts gave a history of typhoid vaccination subsequent to declaration of the carrier. Table X shows the attack rates among unvaccinated household contacts of typhoid carriers previous to discovery by " carrier age " as derived from the household survey. A considerably higher attack rate in this group is observed in " carrier age " 1–5. Unfortunately, sufficient data were not available for a study of attack rates by " carrier age " among unvaccinated contacts subsequent to discovery.

The duration of exposure to the carrier would seem to be of greater importance than the " carrier age " of the carrier in the determination of attack rates on a time scale. Table XI shows the attack rates among the same unvaccinated household contacts of typhoid carriers previous to discovery by " exposure age." The highest attack rate occurs in the first 5 years of exposure,

TABLE IX

Ratio of Household Cases to Carriers by Carrier Age Before and After Declaration

	Before Declaration			After Declaration		
Carrier Age	No. Carrier Years	No. of Cases	Ratio	No. Carrier Years	No. of Cases	Ratio
1–5	1,481	120	0.081	450	10	0.022
6–10	1,089	63	0.058	487	13	0.027
11–15	915	18	0.020	341	12	0.035
16–20	731	36	0.049	229	10	0.044
21–25	526	8	0.015	219	7	0.032
26–30	358	16	0.045	157	12	0.076
31–35	219	7		141	5	
36–40	146	6		83	0	
41–45	101	5	0.034	46	1	0.025
46–50	68	1		22	1	
Over 50	27	0		59	2	
Total	5,661	280	0.049	2,239	73	0.033

TABLE X

Attack Rates Among Unvaccinated Household Contacts of Typhoid Carriers Before Discovery by Carrier Age

Carrier Age	Person Exposure Years	Number of Cases	Rate Per Cent
1–5	835	19	2.28
6–10	772	6	0.78
Over 10	2,655	15	0.56
Total	4,262	40	0.94

TABLE XI

Attack Rates Among Unvaccinated Household Contacts of Typhoid Carriers Before Discovery by Exposure Age

Exposure Age	Person Exposure Years	Number of Cases	Rate Per Cent
1–5	1,685	25	1.48
6–10	1,092	10	0.91
Over 10	1,483	5	0.34
Total	4,260	40	0.94

TABLE XII

Attack Rates Among Household Contacts of Typhoid Carriers Before and After Discovery According to History of Typhoid Fever and Vaccination Status

	Before Discovery			*After Discovery*			*Total*		
	Person Exposure Years	*Number of Cases*	*Rate per 1,000*	*Person Exposure Years*	*Number of Cases*	*Rate per 1,000*	*Person Exposure Years*	*Number of Cases*	*Rate per 1,000*
After typhoid	986	..	..	1,041	..	..	2,027	..	..
After vaccination	145	..	..	1,061	2	1.9	1,206	2	1.7
Not vaccinated	4,243	40	9.4	1,858	13	7.0	6,101	53	8.7

regardless of " carrier age." This might seem to indicate that the carrier does infect or immunize a considerable proportion of individuals in his immediate environment in a few years, but again insufficient data are available to permit the simultaneous consideration of other variables, such as age distribution of contacts, and carriers, as well as other variable factors in the environment.

Typhoid vaccination has been shown to be effective in the protection of certain groups of individuals likely to be subjected to unusual conditions of exposure, and has been recommended for all household contacts of typhoid carriers. This recommendation has not been universally followed among household contacts of carriers in New York State. Thirty-six per cent of contacts were found to have been vaccinated after discovery of the carrier and 3 per cent previous to discovery. Approximately 17 per cent of the total exposure experience in the households of carriers was found to be subsequent to typhoid vaccination. Table XII shows the attack rates among household contacts of typhoid carriers before and after discovery according to history of typhoid fever and according to vaccination status. The attack rate among unvaccinated contacts is significantly higher than among vaccinated contacts, the former being approximately 5 times the latter. Ramsey observed an attack rate among unvaccinated contacts of cases of typhoid fever 4 times that among vaccinated contacts who had received 3 doses of vaccine subsequent to the onset of the primary case. It should be noted that his observations dealt with the period immediately following vaccination, while the contacts of carriers observed in this study include many individuals under continued exposure for from 1 to 25 years and averaging about 4 years following vaccination.

SUMMARY

1. Five hundred and seventy chronic typhoid carriers have been declared in New York State from 1911 through 1935.

2. Exclusive of 59 carriers discovered in state institutions, 72 per cent of all carriers were discovered by epidemiological investigation of sporadic cases of typhoid fever.

3. The incidence of typhoid fever among the household contacts of carriers was found to be 42 times that in the general population.

4. The ratio of cases to carriers before and after discovery was significantly different due entirely to a high ratio in the first 10 years of " carrier age " before discovery.

5. The attack rates among unvaccinated household contacts of carriers was studied by means of " exposure age " and " carrier age."

6. The attack rate among unvaccinated household contacts of carriers was found to be 5 times that of vaccinated contacts.

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Bacteriology of Epidemic Diarrhea

Preliminary Report*

NEWELL R. ZIEGLER, M.D., PH.D.
Department of Bacteriology and Preventive Medicine, University of Missouri, Columbia, Mo.

DURING the past year epidemics of diarrhea of more than usual proportions for Missouri have occurred in cities of the state. During the early part of July, 1936, an epidemic of diarrhea affecting the population of Springfield, Mo., began somewhat suddenly, and by the middle of July a large portion of the population was ill or became ill soon afterward. The disease became extremely widespread, affecting approximately 20,000 to 35,000 or more people among a population of approximately 65,000. Cases developed among those engaged in various occupations and living in all parts of the city.

So many people were ill at one time and the desire for food was so little, that grocery stores had practically no sale of food. People who had been out of the city and returned commonly became ill in about 48 hours. Others were in town only part of a day and became ill 48 hours after leaving. Case histories show that the onset of symptoms was sudden, sometimes with sharp pain in the muscles, sometimes with nausea followed by vomiting, and sometimes with diarrhea. Headaches were common and severe. Some had sharp pains about the chest suggesting involvement of the pleura. These pains radiated toward the back and appeared to be those of a pleurodynia, which has been known to occur in epidemic form. Some had a pleurodynia only; others had it associated with nausea, vomiting, and diarrhea; and still others had the latter symptoms without a pleurodynia. Pains in the leg muscles and in the joints were common and severe. Pain at the onset was sometimes so severe that the patient fainted. Many people were so ill they thought they would die; others hoped they would die. Temperatures varied from normal to 104° F. The disease in some individuals lasted 2 or 3 days, and in others from 2 to 3 weeks, and left the patient very weak. The occurrence of two relatively distinct groups of symptoms suggested that there might have been two kinds of disease prevalent simultaneously. Not infrequently individuals suffered from two or more attacks of the disease. The first attack commonly occurred about July 16 to 17, and the second July 20 to 23. Because of the wide distribution of the disease among the population, water was at once considered as the most likely means of transmission.

The city had only one public water

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supply—that provided by a privately owned utility company. This was derived chiefly from water impounded in an open reservoir but was supplemented by water from a spring and from a deep well. All water with the exception of that from a deep well was subjected to sedimentation and filtration. Part of the supply was prechlorinated with chloramine. The final effluent was chlorinated before it left the filtration plant. It was learned that some institutions in or near the city had an independent water supply and that no more cases of acute diarrhea had occurred among their inmates than might have been expected from the use of city water in their usual migrations about the city. In other institutions, however, such as the City Jail and the Veterans' Hospital, both of which used the city water entirely, and in which there was little chance for infections to occur due to migrations to other parts of the city, very few cases occurred except among employees who returned home each evening.

An examination of the water reports from the State Board of Health showed that some samples of water collected from city taps during the period July 13 to 23 contained members of the coli-aerogenes group, as indicated by gas formation in one or more of five lactose fermentation tubes inoculated with 10 c.c. of water each. Similar results were obtained by the City Bacteriologist, although in many instances lactose was not fermented with gas production for more than 48 hours. An examination of the records of the Utility Company showed that the residual chlorine in the water leaving the filtration plant had been permitted to drop to 0.10 p.p.m. This chlorine residual was raised to 0.15 p.p.m. on July 18, and to 0.20 p.p.m. July 19 to 23. On July 24 the residual chlorine was raised to 0.35 p.p.m. At that time the City Bacteriologist was finding organisms in the water which formed gas slowly from lactose after 48 hours of incubation According to *Standard Methods of Water Analysis* of this Association, this is permissible.

Determination of chlorine residuals in various parts of the city on July 25 showed a chlorine content of 0.0 to 0.2 p.p.m. Water samples for bacteriological analysis were obtained on July 25 and 26. Similar samples were collected from taps in various parts of the city and as it left the filtration plant on August 10 and 20. These were inoculated into standard lactose broth fermentation tubes plus 1 per cent Andrade indicator, in the usual 10 c.c., 1 c.c., and 0.1 c.c. amounts. No typical *B. coli* were found in any of the samples collected from the city water supply on these dates. Further examination of lactose fermentation tubes inoculated with city water by other investigators on July 19, 22, and 23, and submitted to me showed the presence of typical *B. coli*.

Since an epidemic was in progress, although subsiding, further studies were made of these lactose broth cultures. Duplicate plates were made on Endo and eosin-methylene-blue agar. Colorless colonies were found on the Endo medium inoculated from all fermentation tubes with the exception of one sample which was collected August 20. This suggested that disease producing organisms of an intestinal type might be present, or at least that other types of intestinal bacteria than typical *B. coli* were present. Failure to grow on eosin-methylene-blue agar suggested that some of the organisms might be dysentery bacilli. Further studies of organisms isolated from the public water supply showed the presence of many types of Gram-negative intestinal types of bacteria as well as of streptococci. About 150 such cultures have been

partially studied, and others are under investigation.

Among the organisms which were found with considerable frequency in water samples are the following:

1. (10° – 1–2) A Gram-negative bacillus culturally similar to *B. paratyphosus* B but differing from it in not fermenting dulcite. Lactose is fermented with the production of a small amount of acid or acid and gas in 96 hours to 9 or 10 days. Milk is reduced and becomes coagulated with acid in 5 to 10 days. Gelatin is not liquefied.

2. (C. T. 3a) A Gram-negative late lactose fermenting bacillus, which does not produce indole or liquefy gelatin but ferments lactose with the formation of acid and gas in 48 hours.

3. (C. T. 1a) A Gram-negative, indole positive bacillus which liquefies gelatin slightly and produces acid and gas from dextrose, maltose, mannite, sucrose, and lactose.

4. (C. T. – 4–2) A Gram-negative, indole negative organism which does not liquefy gelatin but forms acid and gas from dextrose, maltose, mannite, sucrose, lactose, and xylose.

5. (10_1 – 1–1) A Gram-negative, indole negative organism which resembles *B. paratyphosus* B, but liquefies gelatin, produces a slight amount of acid from lactose in about 1½ weeks, and does not ferment xylose.

6. (10_1 – 7–1a) A Gram-negative organism similar to *B. typhosus* or *B. paradysenteriae* (Flexner), but which is indole positive, liquefies gelatin, and produces slight acidity in lactose after 8 to 10 days.

In addition to the above types of organisms, others were found less frequently and will be described at a later time.

No large number of stool specimens were available for bacteriological examination. From patients who had not recovered promptly or who had recently become ill, stools were obtained and inoculated on Endo agar. From the 1st patient, F 1, a culture of *Bacillus paratyphosus* B was isolated which was agglutinated in specific *B. paratyphosus* B antiserum at a dilution of 1:1,000 or higher. This organism did not ferment dulcite, and in this respect is like those resembling *B. paratyphosus* B, which were found in water and differs from typical *B. paratyphosus* B. The exact relationship between the two organisms has not yet been determined. A second organism resembling *Shigella dispar* was isolated from this patient.

From the feces of a 2nd patient who became ill with vomiting, the following cultures were isolated:

1. (F–2–1) A Gram-negative, late lactose fermenting, indole negative type of intestinal organism, which did not liquefy gelatin, identical in cultural reactions with those found in the city water supply was isolated.
2. *Bacillus typhosus.*

From the feces of a 3rd patient, F 3, Gram-negative, slow lactose fermenting organisms, identical in cultural reaction with those found in the city water supply, were isolated.

From the feces of a 4th patient, F 4, an atypical dysentery-like organism and an indole negative, non-gelatin liquefying organism of the coli-aerogenes group was isolated.

From the feces of a 5th patient, F 5, an organism similar to *B. paratyphosus* B but which produced indole and liquefied gelatin; and an organism resembling *B. typhosus* after 24 hours' growth, but which liquefied gelatin, produced indole, produced a slight bubble of gas from maltose and mannite in 48 hours, and slight acidity from lactose in 10 days were isolated.

In order to obtain additional evidence of the relationship of organisms found in the water supply to the epidemic which had been prevalent, agglutination tests were done with the serum of patients who had recently recovered, using living cultures of organisms which were found in the water with the greatest frequency, and standard cultures of *B. paradysenteriae* (Flexner), *B. paradysenteriae* (Hiss-Russel), *B. paratyphosus* B, and *Bacillus coli* communis. The highest dilution which was used in these tests was 1:1,000. The organisms used and the

TABLE I

Results of Agglutination Tests—Organisms Used and the Titer in Which Agglutination Occurred

Serum	*10° 1–2*	*C. T. 3a*	*C. T. 1a*	*10₁ 1–1*	*B. paradysenteriae (Flexner)*	*B. paratyphosus B*	*B. paradysenteriae (Hiss-Russel)*	*Bacillus coli communis*
1	1/200	1/200	0	0	1/400	1/200	1/200	1/40
2	1/20	1/100	1/100	0	0	0	0	0
3	1/400	1/100	1/100	0	0	0	0	0
4	1/40	1/200	0	0	1/40	....	0	1/100
5	1/1,000	1/1,000	1/100	0	1/40	1/40	1/20	0
6	1/100	1/1,000	1/10	0	0	0	0	0
7	1/100	1/200	1/100	0	1/40	1/200	0	0
8	1/100	1/200	0	0	1/20	0	1/200	0

titer in which agglutination occurred are given in Table I.

While this series of agglutination tests is small, the relatively high titers obtained indicate that at least 2 of the organisms isolated from the water supply are concerned with infection, and that associated with these organisms there were other well known infectious organisms giving rise to mixed infections, or that group agglutination reactions were unusually marked. Studies of these and other organisms isolated from water and feces, utilizing agglutinin adsorption, will be necessary to establish definitely the relationships, if any, between the various organisms isolated and other well known members of the colon-typhoid group. Additional sera * have been collected for agglutination tests to be reported later.

Successive cultures obtained from the water supply indicated a marked change in the bacterial flora. Gas formation became more retarded on lactose and other carbohydrates. This observation that it becomes increasingly difficult to isolate typical gas forming *B. coli* from polluted water as the pollution becomes more remote is well known. Recently Parr [1] noted that the ability to isolate *B. coli* from feces decreased with prolonged storage at low temperatures.

Delayed, or absence of, lactose fermentation by *B. coli* has been observed frequently. Slow lactose fermenting bacteria have been isolated from stools in cases of dysentery by Bamforth,[2] Dudgeon and Pulvertaft,[3] Dulaney and Michelson,[4] and others. Dudgeon and Pulvertaft also isolated them from infections of the urinary tract. Kriebel [5, 6] isolated non-lactose and slow lactose fermenting Gram-negative bacilli from the stools of apparently normal food handlers. Some of these resembled paratyphoid bacilli and were similar to those isolated from the Springfield water supply and from patients there. Although late lactose fermenting organisms when first isolated do not produce a typical red colony with a metallic luster on Endo's medium, they may do so when transferred from an Endo plate the first time or on subsequent transfers. Kriebel [6] isolated similar organisms from single cell cultures of *B. coli*. By appropriate procedures she was also able to cause many of the non-lactose fermenting strains isolated from stools to ferment lactose and to give typical *B. coli* colonies on eosin-methylene-blue agar. She also isolated non-lactose fermenting variants from typical strains of *B. coli*, thus establishing a relationship between the

* Sera supplied by Dr. Leslie Webb, Springfield, Mo.

two organisms. Such late lactose fermenting or non-lactose fermenting bacteria must therefore be regarded as atypical *B. coli*, as suggested by Kriebel,[6] and certainly are entitled to equal consideration with typical *B. coli* in determining the potability of water.

The data presented above with that of other investigators suggest a close relationship between *B. coli* or members of the genus Aerobacter and some of the organisms isolated from the Springfield water supply, from patients ill with dysentery, and possibly other better known members of the colon typhoid group. *B. coli* is known to undergo spontaneous variation. Similarly, it is possible to induce variation in pure cultures of *B. coli* by the use of a number of agents. In our laboratory, strains of *B. coli* have been developed which form gas only from polyhydric alcohols, some having lost the ability to form gas from sodium formate. Similar variants have been reported by Torrey and Montu[7] and Rennebaum.[8] It is easy to conceive of *B. coli* communis losing its ability to form gas from lactose, thus resembling *B. paratyphosus* B in fermentation reactions as has been reported by Kriebel.[9] Single cell indole positive strains of *B. paratyphosus* B have also been isolated from stock museum cultures of *B. paratyphosus* B by Kristensen and Kaufman.[9] Similarly, further loss of ability to form gas from other carbohydrates might give rise to an organism which would resemble *B. typhosus* but would be indole positive. With loss of gas formation, of motility, and of ability to form acid from certain sugars, it might resemble the atypical dysentery bacilli or even the more typical dysentery bacilli. With complete loss of ability to produce acid from sugars an organism would result which would be classified as a member of the genus alkaligenes according to *Bergey's Manual*. Similarly, *B. cloacae*, *B. aerogenes*, or other gas forming Gram-negative bacilli of the Escherichia-Aerobacter group may undergo spontaneous or induced variation.

Some organisms isolated from water were indole negative but fermented lactose and other sugars with the production of acid and gas and did not liquefy gelatin. Such organisms, losing their ability to ferment lactose and sucrose might be identical culturally with *B. paratyphosus* B or *B. typhosus*. Delayed fermentation of lactose is easily induced in *B. coli* and in *Aerobacter aerogenes*. Antigenic composition and virulence may also vary, as has been reported by Torrey and Montu.[7] With loss of lactose fermentation in addition to inability to produce gas from other carbohydrates by the Gram-negative intestinal bacteria there appears to be an increase in pathogenicity except for *Alkaligenes fecalis*, as suggested by Kriebel.[6] Evidence of the variation of bacteria isolated from water is their great variation in morphology and the ready formation of papillae. This has been known to occur commonly in *B. coli* in which variation has occurred. Similar variations are found in the dysentery group of organisms. Seligman,[10] in 1916, described organisms which fermented glucose and lactose with the production of gas as a cause of dysentery and suggested that true dysentery bacilli were possibly derived from, and are closely related to, *B. coli*. Further studies to determine more fully the relationships between organisms in the colon-typhoid group suggested above are in progress.

During the week beginning October 10, 1936, an outbreak of diarrhea and dysentery occurred at Columbia, Mo. Evidence of gross sewage pollution was found in the water supply. Typical and atypical types of *B. coli* as well as other intestinal types of organisms

culturally identical with those isolated at Springfield, Mo., were found in the water supply. Atypical types of colon bacilli, as well as *B. paradysenteriae* (Hiss-Russel) and *B. paradysenteriae* (Flexner) were isolated from patients.

SUMMARY

1. Non-lactose fermenting and late lactose fermenting organisms have been isolated from polluted water supplies and from patients.

2. Agglutination of at least two varieties of such organisms occurs in high dilutions of patients' serum which indicates that they are a cause of the infection. Significant agglutination reactions were also obtained with serum of patients and Flexner and Hiss-Russel dysentery bacilli.

3. Possible relationships between different genera of the colon-typhoid group of organisms has been suggested.

4. During the latter part of a study of the Springfield outbreak, typical *B. coli* were not isolated from the water supply, but pathogenic non-lactose fermenting intestinal types of organisms were present indicating pollution which was not detected by *Standard Methods of Water Analysis*. It would appear, therefore, that *Standard Methods* should be revised in such a way as to prevent the development of such outbreaks of dysentery as have been described.

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Five Hundred Cases of Scarlet Fever Caused By Milk

A RECENT epidemic of approximately 500 cases of scarlet fever in Owego, Tioga County, N. Y., has been traced to the use of raw milk from an infected cow, according to a statement issued by the State Department of Health. The source of the outbreak was suspected early in the epidemic, and the sale of raw milk from the dairy concerned was stopped on December 23, 1936. This action was followed by a rapid decline in the number of cases.

The investigations revealed that the suspected animal had been taken into the herd at the dairy farm a few days before the beginning of the outbreak. Immediately prior to that time the cow had been on a farm on which it was learned there had occurred 3 cases of scarlet fever, one of which was in a boy who had milked the cow. The evidence indicated that the animal had acquired the infection there and was infected when sold to the dairy farm.

As a result of this outbreak of scarlet fever, and the determination of its cause, the town of Owego has passed an ordinance requiring the pasteurization of all milk sold there.—*Pub. Health Rep.*, Jan. 22, 1937, p. 113.

Mental Hygiene Component of a City Health District*

RUTH E. FAIRBANK, M.D.
Psychiatrist in charge of the Mental Hygiene Study, School of Hygiene and Public Health, Baltimore, Md.

AT the Annual Meeting of the American Public Health Association in October, 1935, a very comprehensive and stimulating paper on "A Community Program for the Prevention of Mental Disease" was presented by Dr. Elizabeth Adamson.[1] It is of interest to note that the beginnings of such a program had already taken shape in October, 1934, when a Study of Mental Hygiene in the Eastern Health District of Baltimore was organized by the Johns Hopkins University as a joint activity of the Department of Psychiatry of the Medical School and the School of Hygiene and Public Health. The work was made possible by a grant from the Rockefeller Foundation. The Study Unit is an independent organization under the administrative direction of the Dean of the School of Hygiene and Public Health and under the general psychiatric guidance of the Director of the Henry Phipps Psychiatric Clinic.

The group, including a psychiatrist, a statistician, a psychiatric social worker and a clerk, began in October, 1934, a Mental Hygiene Field Study of the Eastern Health District of Baltimore. This area, with a population of about 57,000 individuals, about one-fourth of whom are colored, lies in the immediate vicinity of the Johns Hopkins Hospital and the School of Hygiene. The organization of this district, as well as the clinical facilities available to it, offer an unusually attractive field for study and for the setting up of experimental procedures in prevention.

The Eastern Health District, established in 1932 through the coördination of personnel from 4 organizations, directs the health of the community along lines of prevention through its administrative organization and its active program of research in the field of public health. The regular staff of the District Health Service is in close daily touch with a large part of the population and has had contact, at one time or another, with about 90 per cent of the homes in this area. It has established unusually satisfactory relationships with the private physicians practising in the district. There is a large registration of infants and preschool children in the child hygiene clinics and a well organized School Health Service. From the standpoint of clinical service, a very considerable part of the medical and surgical service of the community is rendered in the wards and clinics of the Johns Hopkins Hospital. Of this group, the Henry Phipps Psychiatric Clinic, together with the more recently developed Psychiatric Clinic in the

* Read at a Special Session on Mental Hygiene of the American Public Health Association at the Sixty-fifth Annual Meeting in New Orleans, La., October 20, 1936.

Harriet Lane Home for Invalid Children, offer unrivalled facilities for the clinical care of cases needing psychiatric treatment. The staffs of both clinics are available for advice and consultation. The district, therefore, offers unusual facilities for the study of the problems of mental health, as part of the general studies of disease prevalence in the community. It especially offers opportunities to create and to follow up experiments over a period of years, during which information of a character not possibly obtainable by a cross-section study can be accumulated and its significance determined.

A complete census of the Eastern Health District had been made in 1933 by the Baltimore City Health Department and the School of Hygiene and Public Health. This furnishes basic data for a roster of the families and individuals living in the district, in addition to information pertinent to public health problems. This large and valuable body of material, constituting a fairly complete set of vital statistics of the community for the year 1933, influenced the decision to confine the field study to the problems of mental health which presented themselves during that same year. Further facts of interest to this background of social, economic, racial, and health data were provided through the coöperation of the Baltimore Criminal Justice Commission, which has made a block-by-block survey of the district. This material presents the factors considered favorable and unfavorable to the youth, from the viewpoint of educational and recreational facilities, gang hang-outs, saloons, and the like.

Embracing the public health point of view and adopting methods similar to those used in making an epidemiological survey of the communicable diseases, the Mental Hygiene Field Study followed a plan, (1) to determine the prevalence of mental ill-health, defect and instability in the area in relation to its population; (2) to discover, in as great detail as was practicable, the economic, social, racial, and personal problems underlying these conditions; (3) to become acquainted with the existing facilities for dealing with these problems; and (4) to devise and put into experimental operation, as part of the existing health service of the community, such administrative procedures as would seem to offer hope of effective management and prevention.

In determining the methods to be used in such a field study, a house-to-house canvas was not undertaken, for obvious reasons. Such an attempt would meet immediate defeat through the lack of frankness of individuals regarding mental instability in the family. The small staff, as well as the difficulties in getting individuals to coöperate, made any extensive personal examination impossible. It was therefore decided to confine the survey to all case records with mental hygiene problems found in any of the psychiatric clinics, institutions, schools, courts, and social agencies, with which individuals from this district might have had contact. While this does not include cases in private homes who did not call for attention, it was anticipated that some of these would come to light through the coöperation of the public health nurses and the private physicians practising in the district.

Using a street list of the Eastern Health District with which to identify the individuals as coming from this area, a study was first made of the cases which had come to the out-patient department of the Henry Phipps Psychiatric Clinic during the year 1933. The histories of these patients offered examples of the best service rendered in the district.

A search of these records was made

for the complaint or problems presented and for identifying material regarding the individual and his parents or spouse. A brief description was obtained of the home life and economic status, the physical condition, the school record and estimate of intelligence when a test had been made, and of the personality traits of the individual and his parents or spouse. A note on the treatment and outcome, together with a statement of the other members of the household presenting problems in 1933 and the social agencies known to have had contact with the individual or his immediate family, were likewise obtained.

This initial study gave an opportunity to make a provisional index of the types of problems of mental health to be met, as well as to organize the methods and technic to be followed in the less clearly reported material from other sources.

For persons presenting mental illness or mental deficiency of sufficient severity to bring them under psychiatric treatment, a search was made of the records of all custodial institutions, mental hospitals, and mental clinics to which it was reasonably possible patients from the district might have been sent. The records of the special classes of the public school system and the Training School for Defective Children were gone over. Records of the social service agencies serving the area have been searched for individuals showing difficulty in adjusting to their social, familial, educational, or industrial environment, and those of all courts and correctional agencies have likewise been examined.

The general types of problems found were mental illness, mental deficiency, psychopathic personalities, behavior problems and delinquency in children, and various kinds of instability manifesting themselves in such patterns as alcoholism, drug addiction, marital and family difficulties, cruelty to and neglect of children, sex difficulties, inability to hold a job, conflicts with the law, and the like.

In order to get as complete an individual record as possible, with a longitudinal picture of those people who had come under psychiatric observation or treatment in the years past, each of the approximately 4,000 cases in the resultant individual name file was checked through the files of the Henry Phipps Psychiatric Clinic, the state hospitals and the Training School for Defectives as far back as any record was kept.

The field study has collected the available information about all cases presenting problems of mental health in the Eastern Health District of which there was any known record for the year 1933. This material is now undergoing a thorough statistical analysis. When checked against the census data for the same period, it will be possible to estimate the prevalence of mental hygiene problems in the total population of a district about which much basic material is available. This "epidemiological" approach has provided, therefore, a rich background for further study, and has already given certain leads along the line of possible prevention.

A study of the survey material, from the viewpoint of classification into age groups and their specific needs, has brought to the fore the prevalence in many children of behavior problems, of lack of habit-training and discipline, of over-solicitude and spoiling and, especially in the adolescent group, of delinquency. This has brought strongly into recognition the need for organized effort toward the education of parents, with the expectation that, in the future, some of these difficulties may be prevented.

Realizing the opportunities available for such parental education and guid-

ance in this district, in the winter of 1935 an experimental consultation service was started with the mothers, who bring their babies regularly to one of the three existing child hygiene clinics. As a part of the routine procedure of this service, these mothers are referred to the psychiatrist of the Mental Hygiene Study. The children have a small playroom, where they are under the observation of the Mental Hygiene Study social worker, who is also a psychologist, and those of suitable age are given an intelligence test.

The general procedure has been to interview an average of 6 mothers during the afternoon clinic and to get as comprehensive a history as the time allows. An effort is made to get facts which convey an estimate of the intelligence and the emotional stability of the parents. Facts are sought which indicate the degree of family harmony or lack of it, which show the attitude of the parents toward the child and with which to evaluate the responsiveness of the mother in terms of her interest and capacity to carry out a plan for her child. Observations are noted regarding the behavior of the children, and for those under 3 years of age an estimate is made of whether or not this behavior approximates the so-called levels of normal development, as indicated by such authorities as Gesell [2] and Bühler.[3] A statement is obtained of the problems which the child presents.

Since many of the children are very young, it is often found that no difficulty has yet arisen. Many of the mothers, however, are eager for advice about how to train their children, and the opportunity is taken to educate them in very simple rules of habit training, discipline, and the principles of self-control and self-reliance, as outlined by Thom,[4] Blatz,[5] and Richards.[6] This includes specific advice about training in habits of eating, sleeping, and elimination, as well as discussion of the need for social development through play with other children of about the same age.

The frequent lack of playmates and play facilities during the preschool years, as well as the fact that many of the mothers are too busy and harassed to devote enough time to training the youngsters, have led to an effort to establish nursery schools in the district. The value of the modern nursery school in establishing a healthy routine for building up good habits, as well as in providing an excellent medium for the development of self-initiative, self-reliance, self-control, and the ability to get along with others has been well established. Such a foundation should be the naturally developed bulwark of every child. However, the histories of adults suffering from a variety of mental reactions, most commonly called psychoneuroses, indicate the lack of such self-discipline and emphasize the importance of giving the child a fair chance, through such training, as will augment the development of these inbred capacities to adjust to a social world and its demands.

These interviews often bring up for discussion the mother's own problems, which inevitably affect the child. Where the problem with either the parent or the child has become outspoken and requires specific psychiatric treatment, arrangements are made for an appointment in one of the available clinics, since it is not the function of the mental hygiene group to furnish intensive clinical service.

The mothers who take advantage of the services of a civic health department come from a group that is not apt to be reached by modern theories in regard to child training made available through the literature. The fact that they bring their well babies to the child hygiene clinic, however, indicates a willingness

to take advantage of modern methods of prevention. In the past 9 months, about 150 mothers and 200 children have been interviewed, many of whom have returned for further advice or to report on the child's progress.

During the year, the psychiatrist will have had interviews with most of the mothers who bring their children to this child hygiene clinic. A follow-up visit to the home, made by the psychiatric social worker with the district nurse, furthers the recommendations and plans outlined in the interview with the psychiatrist. It is anticipated that these children will be followed over a period of years. There will be an opportunity for a control group and for the collection of facts for further research in this field, about which much still remains to be discovered.

The enthusiasm of the mothers in this clinic has led the nurses to ask for consultations from the other clinics in the district and will lead to the organization of further service of this nature. As cases have accumulated and these requests for special consultations have increased, regular staff meetings with the district health nurses have become established. This provides an excellent opportunity for stressing the principles of mental hygiene as part of the public health educational program for the nurses in the district.

In the field study, cases were found which had refused to go to a psychiatric clinic, or in which, for one reason or another, an indicated psychiatric consultation had not been carried out. This has led to a second experimental procedure. A psychiatric consultation service has been offered to the private physicians practising in the district. This is offered on the same basis that the health district provides consultation service in the communicable diseases. This psychiatric service is, for example, available to those cases who refuse, or are too ill, to go to a clinic or who are unable to afford a private consultation. The warmth of reception, when introduced by one of the doctors on the public health staff, indicates the wisdom and thoughtfulness with which the staff of the Eastern Health District has made friends with the practising physicians. The response of requests for consultations has been encouraging. While the initial requests are largely for consultation regarding outspoken cases of mental illness and behavior problems, it should be possible in time to lead the interest to the more preventive aspect.

This close affiliation between the physicians and nurses of the district and the psychiatrist and social worker of the study is being fostered, with the hope that early symptoms can be recognized and cases brought to attention and help that would not otherwise be noticed until a more stubborn condition had developed. Other affiliations have been made, the importance of which in any preventive program deserves emphasis. The search for case records has made it possible for the Mental Hygiene Study group to become acquainted with and to become known to the personnel of the many agencies and institutions dealing with the welfare of the family and the care of the unstable and dependent. This has led to requests for service on special committees. In this way the mental hygiene activities of this City Health Department are becoming affiliated with those of other professional groups interested in these problems and coöperation in any organized effort at prevention is made possible.

The period of infancy and childhood has its own problems, many of which may disappear as such without much being done about it. Research into the etiology of mental illness indicates, however, that many of the patterns of later maladjustments are laid down during

these earliest years. Personality traits, such as lack of self-control, inability to give and take, undisciplined aggressiveness, or too little self-confidence, over-sensitiveness and the like—traits inborn but greatly influenced by early environment, pay the toll when disappointments and the struggle for satisfactions in life have to be met during adolescence and adulthood.

Common sense must grant that the period of growth is the ideal time to develop and foster such habits as emotional control, self-reliance, self-dependence, and the ability to get along with one's fellows. That the greater burden of such training rests upon the parents and depends upon the home environment is obvious. By the time the child reaches the public school, unless such training has been available, patterns may have developed which require child guidance clinics to undo and to reëducate.

The investigations to date indicate strongly that integration of a mental health group with the regular city health department offers an ideal situation for carrying out a program which gives attention to the total individual. Such an organization, in which the various departments work together as a whole, embraces the mental, emotional, and physical health of the child. This integrated unit gives promise of reaching a public and of arousing community interest and coöperation which individual effort cannot hope to achieve.

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Medical Science

THE first impression that any survey of the present aspect of medical science must produce is one of confusion. An immense amount of investigation into the causes and treatment of disease will be found going on, but too often it is ill conceived and ill directed, with the result that much so-called "research" is a mere beating of the air, a form of solemn trifling, wasteful alike of time and money. This confusion is reflected in medical publications, which have become excessive in number, and often so highly specialized that their very terminology is to be understood only by the initiated; full of facts and observations, but poor in ideas, in fertile hypotheses, and in helpful generalizations. We find the same disorder in the application of medical science to practice, for, in this country at least, our health services show a chaotic mixture of individualism and socialism, of commerce, charity, and State aid.—Robert Hutchison, M.D., The Progress and Present Aspects of Medical Science, *Brit. M. J.*, Jan. 9, 1937, p. 3966.

Standards for Determining the Suitability of Bile Specimens for Detection or Release of Typhoid Carriers*

FILIP C. FORSBECK, M.D., F.A.P.H.A., AND HARRIETT C. HOLLON

Associate Director, Bureau of Communicable Diseases; and Bacteriologist, State Department of Health, Lansing, Mich.

THE laboratory examination of biles in typhoid control is valuable in the release of cases and in more definitely determining the status of persons still suspected of being carriers though all feces specimens submitted have been negative. It is essential in determining eligibility of carriers for surgical treatment and for release thereafter.

That one negative laboratory report on a bile specimen bears more weight in the detection and release of typhoid carriers than a number of negative feces specimens is well established, and because of their relative validity, bile specimens are becoming more generally required for release of carriers following cholecystectomy. As long ago as 1916, Garbat [1] showed that bile frequently was positive in convalescent carriers when the feces had become consistently negative.

However, this does not mean that we are able to place complete confidence even in negative reports on bile specimens. The reason may well be illustrated by 2 experiences: A young woman had been feces positive for 9 months after onset of typhoid fever. At the time of becoming feces negative she was an inmate in a state hospital, where, upon our request, a duodenal drainage was attempted. The specimen obtained, the characteristics of which were not recorded, was negative. In view of a negative bile report and 4 consecutive negative feces obtained during convalescence, the case was released. During the following year she married. She was discovered to be a chronic typhoid carrier when she fatally infected her husband with typhoid fever. Suffering from biliary colic at the time of discovery, she later submitted to cholecystectomy. The bile at that time was positive. She was later released following fulfillment of the state requirements. The death of the husband might have been prevented had we realized the insignificance of the negative report on the original bile specimen submitted.

The second case was that of a registered nurse submitting to cholecystectomy after which she had 15 consecutive negative feces. A gastric juice-bile

* Read before the Laboratory Section of the American Public Health Association at the Sixty-fifth Annual Meeting in New Orleans, La., October 21, 1936.

mixture obtained in the hospital employing her, and submitted to our laboratory, was negative. A later and more satisfactory bile specimen was positive.

Reliable as bile * specimens are then both bacteriologically and as to authenticity, they would be made even more reliable if standards could be established for the acceptability of specimens submitted.

During the past 2 years we have studied certain characteristics of bile specimens, and specimens submitted as bile, with the hope of increasing the dependability which could be placed upon negative specimens. In this study we have profited by the well known fact that too high a concentration of hydrochloric acid will kill typhoid organisms and that the hydrochloric acid of gastric juice precipitates and oxidizes bile salts with marked color changes in the bile.

METHODS

Duodenal Intubation—Most of the specimens considered in this study have been obtained by one of us (F.C.F.). Earlier specimens were obtained by a technic essentially as described by Rehfuss.[2] During the past year a modified technic [3] has been used which has lessened the ordeal of obtaining bile but which apparently has not influenced the type of specimens, except that a profuse backflow of bile into the stomach is more likely. Our experience has been exclusively with the Rehfuss tip. Material has been withdrawn by gentle suction with a 20 c.c. syringe and discarded or collected by means of a 3-way valve connecting duodenal tube and syringe. Mucus frequently obtained early in the procedure always has been discarded. Subsequently specimens have been collected as they changed in character. The procurement of apparently satisfactory bile specimens often has been followed by stimulation with saturated magnesium sulphate and the subsequent collection of another bile specimen. More recently, fractions of both satisfactory and unsatisfactory specimens have been placed in buffered broth at the bedside. Usually 3 to 6 specimens have been collected, varying in color, turbidity, and viscosity. No attempt has been made to obtain the " B " bile of Lyon, and waits of 10 to 30 minutes after magnesium sulphate stimulation has yielded only "A" bile. This is perhaps as might be expected since the lack of " B " bile is said to indicate cholecystopathy which is the rule in chronic typhoid carriers.

Recording of Physical Characteristics and Hydrogen Ion Concentration—Color, turbidity, and viscosity of specimens have been recorded shortly after procurement. It is essential that color and turbidity be recorded immediately after procurement since bile in gastric juice-bile mixtures invariably changes in color and degree of turbidity with time. Hydrogen ion concentrations have been determined in from a few minutes to a few days. Color nomenclature has been indefinite, but perhaps accurate enough for the purpose. Related colors have been grouped; for example, canary yellow, lemon yellow, pale yellow, and straw have been classified as yellow.

Turbidity of fluids has been classified as the typical turbidity of gastric juice after fasting—that is, an almost clear fluid with white or light gray floccules; as slightly but uniformly cloudy; as very cloudy but still translucent; as opaque; and finally as almost or entirely clear.

Viscosity has been expressed as +, representing about the viscosity of

* For the present purpose it is sufficient to speak of a duodenal specimen as bile. Because of unknown amounts of pancreatic juice, gastric juice, etc., it would be more strictly true to speak of clear, amber, viscous, usually alkaline specimens as duodenal contents.

water; as ++++ representing the viscosity of the typical bile specimens obtained; and as ++ and +++ representing slightly and moderately viscous specimens.

Hydrogen ion concentration has been determined colorimetrically by the spot technic, using steps averaging ½ pH.* The pH determinations are rough approximations only. Unfortunately pH standards of under 4.4 were not conveniently available.

Bacteriologic Technic—Almost all bacteriologic examinations have been made by one of us (H.C.H.). In general, examinations have been made of each distinctly different specimen, whether apparently gastric juice, a gastric juice-bile mixture, or bile. The few specimens collected in the laboratory were cultured at once, those in the field usually within 24 hours after collection.

One loopful of the specimen to be examined was cultured on a Krumwiede's brilliant green plate, 0.15 per cent dilution, another loopful on an Endo's plate, and approximately 0.5 c.c. in 10 c.c. of 0.1 per cent dextrose broth. Only once when typhoid bacilli were known to be present in the bile did the organisms fail to grow on solid media, and in this instance growth was obtained on solid media after sub-culture from dextrose broth. When *E. typhi* was found, it was always in pure culture.

After 18–24 hours incubation at 37° C., single colonies were transferred to triple sugar medium. Twenty-four hours later single sugars in semi-solid medium were inoculated from the triple sugar slants. Dextrose, lactose, sucrose, mannite, maltose, and xylose were used. The single sugar medium used was 0.5 per cent veal infusion agar containing 1.0 per cent of the carbohydrate. All single sugar fermentations were typical of *E. typhi*. The reaction in xylose varied, some cultures fermenting the sugar, others not.

A macroscopic agglutination [4] was then done from the culture on the triple sugar agar slant. The organisms were suspended in physiological salt solution and added to typhoid immune serum diluted 1:40–1:640. The period of incubation was 2 hours in a water bath at 56° C. All cultures were agglutinated by the typhoid antiserum in a dilution of at least 1:640.

The formula for the buffered broth used is as follows:

Veal infusion	1 l.
Peptone	5 gm.
Sodium chloride	10 gm.
Dextrose	10 gm.

Adjusted with N. sodium hydroxide to a pH of 7.0 to 7.2.

To determine the viability of typhoid organisms in hydrochloric acid, solutions of various hydrogen ion concentrations were prepared and buffered with pig bile.

Selection of Cases—The study includes 53 duodenal intubations performed on 39 persons in the past 2 years. Physical characteristics and hydrogen ion concentration of biles with a few exceptions have been noted and tabulated with no previous knowledge of bacteriologic findings. To appraise the value of these characteristics in determining the reliability of a specimen, it is necessary to know beyond reasonable doubt which specimens should have been bacteriologically positive, whether or not they were. Thus we have included in that part of our study which compares physical characteristics with bacteriologic results only those 25 persons who were proved by one intubation or another to be biliary tract car-

* We are indebted to Dr. J. T. Tripp and Dr. G. D. Cummings for preparing materials for our use in connection with the determination of hydrogen ion concentration.

riers, but including the negative specimens from these carriers. No physical difference has been noted between positive biles and negative specimens expected to be negative.

RESULTS AND DISCUSSION

Relationships of Color, Turbidity, and Viscosity to Each Other and to Hydrogen Ion Concentration—The physical characteristics and hydrogen ion concentration of any sample collected depends upon the relative amounts present of the 2 very different fluids, gastric juice and bile. Gastric juice is watery, with more or less white or gray solids and is very acid. "A" bile is amber, clear, very viscous, and alkaline. The viscosity and hydrogen ion concentration of a gastric juice-bile mixture are between that of gastric juice and bile and depend upon the amount of each in the mixture. The same is not true of color and turbidity because the hydrochloric acid of the gastric juice precipitates bile salts with the formation of turbid, yellow, green, or blue-green fluids. The amount of solids precipitated in a gastric juice-bile mixture depends upon the amount of bile and the degree of acidity. Roughly the color changes from blue-green, to green, to yellow, to amber with decreasing acidity of the mixture.

An early specimen may be more viscous than gastric juice if collected before all mucus present during intubation has been discarded. On the other hand, clear amber specimens, apparently "A" bile, may have a viscosity of less than ++++ if diluted with water, magnesium sulphate solution, or highly diluted gastric juice. Lyon's "B" bile has never been obtained with the technic employed.

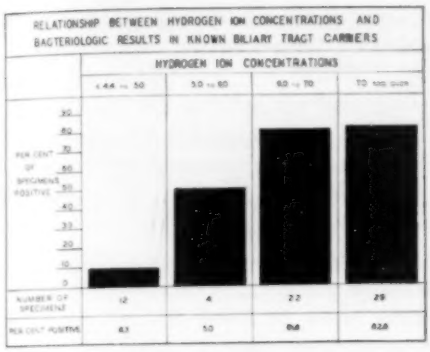
In a typical case bile mixed with gastric juice is obtained before the tip has entered the duodenum. Such specimens are blue-green or shades of green if the gastric juice is highly acid, but if the gastric juice has been diluted and removed repeatedly, the mixture is likely to be a shade of yellow. Typical gastric juice is followed by blue-green, green, green-yellow, yellow, yellow-amber, and amber fluids with the gastric juice almost clear; the greens and yel-

TABLE I

RELATIONSHIP OF COLOR, TURBIDITY AND VISCOSITY TO HYDROGEN ION CONCENTRATIONS

Physical Characteristics	*Percentage Distributions of Hydrogen Ion Concentrations*				*Number of Specimens*
	<4.4 to 5.0	*5.0 to 6.0*	*6.0 to 7.0*	*7.0 and Over*	
Color:					
Bile tinged	0	43	43	14	7
Shades of green	82	0	0	18	11
Shades of yellow	9	4	35	52	23
Amber	5	0	36	59	22
Turbidity:					
Gastric Juice	33	17	25	25	12
Slightly cloudy	12	0	50	38	16
Very cloudy	13	13	54	20	15
Opaque	73	5	11	11	19
Clear	0	6	22	72	32
Viscosity:					
+	43	17	20	20	46
++	9	0	0	91	11
+++	8	0	46	46	15
++++	0	0	50	50	22

FIGURE I


RELATIONSHIP BETWEEN HYDROGEN ION CONCENTRATIONS AND BACTERIOLOGIC RESULTS IN KNOWN BILIARY TRACT CARRIERS
HYDROGEN ION CONCENTRATIONS
PER CENT OF SPECIMENS POSITIVE
NUMBER OF SPECIMENS
PER CENT POSITIVE

lows opaque or cloudy; and the amber bile, clear or almost so. In general, the shades of green are unsatisfactory, the shades of yellow may be satisfactory, and amber is usually satisfactory for bacteriologic examination. Thus, the greens averaged not more than pH 4.7 and probably considerably less since our colorimetric standards were no lower than pH 4.4 and we know gastric juice has a pH of from 1.0 to 3.0. The specimens with more bile and less gastric juice, that is, the yellows, averaged pH 6.6, while those apparently bile averaged pH 7.1. The relationships of physical characteristics to hydrogen ion concentrations may be noted in Table I.

Relationship Between Hydrogen Ion Concentration and Bacteriologic Findings—In Figure I are summarized the hydrogen ion concentrations and bacteriologic findings of all specimens from the carriers who had at least one positive in the group of specimens obtained at one intubation except those obviously not containing any bile. When one considers the limited pH range of bacterial growth, the findings are as one might expect—that specimens are likely to be positive if in the pH range of 6.0–8.0 and likely to be negative if below pH 5.0. Perhaps the relationships of physical characteristics, hydrogen ion concentration, and bacteriologic findings can be visualized best by a typical series of specimens obtained during an intubation as described in Table II.

In comparing bacteriologic results in different types of specimens, it is essential to include only those persons almost certain to be biliary tract carriers; that is, chronic feces carriers who have not submitted to cholecystectomy. It is

TABLE II

PHYSICAL CHARACTERISTICS, HYDROGEN ION CONCENTRATIONS AND BACTERIOLOGIC FINDINGS IN A TYPICAL SERIES OF SPECIMENS OBTAINED BY GASTRIC AND DUODENAL DRAINAGE

	Specimens in Order of Procurement							
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
Color	Gastric juice	Yellow tinge	Blue-green	Green-yellow	Yellow	Yellow-amber	Amber	Light amber
Turbidity	Floccules	Floccules	Opaque	Opaque	Cloudy	Almost clear	Clear	Clear
Viscosity	+	+	+	++	++	+++	++++	+++
Hydrogen ion concentration	<4.4	<4.4	<4.4	5.0	6.4	7.0	8.0	7.4
Bacteriologic findings	Neg.	Neg.	Neg.	Neg.	Pos.	Pos.	Pos.	Pos.
Impression of specimen	Gastric juice	Bile stained gastric juice	Moderate amount of bile in highly acid gastric juice	Considerable bile, considerable gastric juice	Mostly bile	Bile; slight amount of gastric juice	Bile	Bile diluted with magnesium sulphate solution

TABLE III

NEGATIVE SPECIMENS OBTAINED FROM KNOWN FECES CARRIERS IN WHICH LATER SAMPLES OBTAINED DURING THE SAME DRAINAGE WERE POSITIVE

Carrier Number	Description of Best Negative Sample				Technic Used Previous to Positive Sample	Description of Positive Sample			
	pH	Color	Viscosity	Turbidity		pH	Color	Viscosity	Turbidity
26	4.4	Blue-green	+	Opaque	$MgSO_4$	5.8	Yellow-green	+++	Opaque
98	7.0	Amber	++++	Clear	$MgSO_4$	6.9	Amber	++++	Clear
130	8.0	Amber	++++	Clear	Buffered broth	—	—	—	—
137	7.0	Yellow	+	Opaque	Buffered broth	—	—	—	—

true that Garbat,[1] for example, found a person during convalescence who was apparently a pure intestinal carrier. Three consecutive bile specimens were negative, while the feces were positive. In our own experience, we have had 2 negative biles followed by a positive, but we know that the 2 intubations with negative results had not yielded satisfactory specimens. Garbat does not mention the character of his biles, but in view of the high percentage of positive biles reported they were probably satisfactory. Yet, in view of our findings, we suspect that this person may have been a biliary tract carrier. Admittedly, intestinal carriers, by which we mean carriers in whom the focus of infection is in the intestine—not simply feces carriers—are rare. We believe our data cast doubt on the adequacy of previous technic and therefore upon the validity of previously reported pure intestinal carriers. The obtaining of a negative specimen from a chronic feces carrier who has not had a cholecystectomy means that we should suspect the adequacy of our technic.

Evidence in Table III bears out this point. In this table are shown the descriptions of negative specimens which were positive when placed in buffered broth or were followed by positive specimens obtained with magnesium sulphate stimulation. In Carrier 26 the negative specimen could hardly have been otherwise. In the other 3 instances the physical characteristics and hydrogen ion concentrations were such that positive results were expected; yet only

TABLE IV

DATA CONCERNING NEGATIVE BILE SPECIMENS OBTAINED FROM KNOWN FECES CARRIERS LATER PROVED TO BE BILIARY TRACT CARRIERS BY SUBSEQUENT INTUBATIONS

Carrier Number	Date	Location of Bucket	$MgSO_4$	Broth	Impressions of Specimens
108	1/10/36	Stomach	No	No	Slightly bile stained gastric juice
94	5/23/35	Stomach	No	No	Bile stained gastric juice
95	5/24/35	Stomach	No	No	Typical bile except pH 6.0
56	5/24/35	Stomach	No	No	Bile stained gastric juice
98	9/24/35	Stomach	No	No	Poor specimens
98	9/ 7/36	Stomach	No	No	Poor specimens pH 6.4–6.8
11	6/ 1/36	Stomach	Yes	No.	Viscosity ++, pH 7.0, amber, clear, canary yellow, bubbles

after magnesium sulphate stimulation in 1 instance, and the use of buffered broth in the other 2, were positive results obtained.

In Table IV is listed the best appearing specimen for each of 7 attempted duodenal intubations on 6 carriers. In all cases the specimens were negative. The tip failed to enter the duodenum in every case. Broth was used in no case. In Carrier 11, $MgSO_4$ was used, contrary to our habit of using $MgSO_4$ only after the tip has engaged in the duodenum. In spite of the fairly satisfactory appearing specimen, no typhoid organisms were found. Later intubations on all of the 7 carriers yielded positive biles. It is interesting to note that these positives were in one manner or another superior to the unsuccessful previous intubations, though certainly not uniformly excellent.

From what evidence we have, then, it seems that more positive results would have been obtained had the obviously highly acid gastric juice-bile

TABLE V

GROWTH OF TYPHOID ORGANISMS ON ENDOTYPHOID MEDIUM AFTER EXPOSURE TO VARIOUS CONCENTRATIONS OF HYDROCHLORIC ACID

Time of Exposure	*pH Values*											
	1.3	*1.7*	*2.0*	*2.3*	*3.4*	*3.7*	*4.2*	*4.9*	*5.3*	*5.9*	*6.8*	*7.2*
30"	—	—	—	One colony	+	+	+	+	+	+	+	+
2'	—	—	—	+	+	+	+	+	+	+	+	+
4'	—	—	—	—	+	+	+	+	+	+	+	+
6'	—	—	—	—	+	+	+	+	+	+	+	+
8'	—	—	—	—	+	+	+	+	+	+	+	+
10'	—	—	—	—	+	+	+	+	+	+	+	+
15'	—	—	—	—	+	+	+	+	+	+	+	+
30'	—	—	—	—	Few colonies	+	+	+	+	+	+	+
45'	—	—	—	—	Few colonies	+	+	+	+	+	+	+
60'	—	—	—	—	Few colonies	+	+	+	+	+	+	+
2 hrs.	—	—	—	—	Few colonies	+	+	+	+	+	+	+
3 hrs.	—	—	—	—	Few colonies	+	+	+	+	+	+	+
4 hrs.	—	—	—	—	Few colonies	+	+	+	+	+	+	+
6 hrs.	—	—	—	—	Few colonies	+	+	+	+	+	+	+
7 hrs.	—	—	—	—	Few colonies	Few colonies	+	+	+	+	+	+
12 hrs.	—	—	—	—	—	Few colonies	Few colonies	+	+	+	+	+
24 hrs.	—	—	—	—	—	Few colonies	Few colonies	+	+	+	+	+
48 hrs.	—	—	—	—	—	—	+	+	+	+	+	+
72 hrs.	—	—	—	—	—	—	+	+	—	+	+	+
96 hrs.	—	—	—	—	—	—	+	+	+	+	+	+
6 days	—	—	—	—	—	—	—	—	—	—	+	+
7 days	—	—	—	—	—	—	—	—	—	—	+	+

mixtures as well as the apparently satisfactory bile specimens been placed immediately in buffered broth.

Of further interest is a laboratory experiment summarized in Table V. A drop of a freshly prepared suspension of typhoid organisms was placed in each of a series of tubes containing hydrochloric acid solutions of different pH values buffered with pig bile, and permitted to stand at room temperature. It may be noted that in the tubes with pH values of 1.3, 1.7, and 2.0, transfers yielded no growth, even when the organisms had been in the hydrochloric acid for as short a time as 30 seconds. However, in a solution only as acid as pH 3.7, the organisms were not killed in 24 hours. While the experiment does not simulate natural conditions, the value of placing a fraction of bile-gastric juice mixture in broth is illustrated.

It is our hope, based on the evidence submitted, that with the proper procurement, selection, and handling of bile specimens, almost complete confidence may be placed in the validity of negative laboratory reports.

CONCLUSIONS

1. Maximum confidence may be placed in a negative laboratory report on bile obtained in connection with the diagnosis and release of carriers, provided the specimen is amber, clear, viscous, and alkaline, provided it has been obtained following stimulation with magnesium sulphate, and provided it has been protected on its way to the laboratory in buffered broth.

2. In the light of these findings it would seem necessary to question the incidence of pure intestinal carriers and even to cast some doubt on their existence.

3. Should the accumulation of data justify the confidence which we believe may be placed in a negative report on a bile specimen meeting the above standards, it is thought that the number of release biles following cholecystectomy may be reduced from 2 or 3 down to 1.

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Mysore Quarterly Report

A QUARTERLY REPORT (January–March, 1936) of the Mysore State Department of Health in India has reached this office. The whole world is kin in public health, as the slogan the report carries is that of Dr. Hermann M. Biggs, "public health is purchasable."

The report shows that the State Health Department of Mysore is well organized, with Bureaus of Administration, Maternity and Child Welfare, Epidemiology, Laboratories, Health Education, Rural Health, Sanitary Engineering, and Vital Statistics.

All these Bureaus have as directors and as members of their staffs well trained personnel. The report also indicates a close link-up between the State Health Department and all voluntary health agencies.

Some Implications Afforded By Mortality and Morbidity Statistics*

DEAN K. BRUNDAGE, F.A.P.H.A.

Senior Statistician, Office of Industrial Hygiene and Sanitation
U. S. Public Health Service, Washington, D. C.

NOT so long ago the usual introduction to a paper on some phase of industrial morbidity or mortality in this country consisted of a lament over the paucity of data on the subject. Although our knowledge of the health status of industrial workers in general and of certain occupations in particular is still quite meager, several interesting and important studies have been added to the literature in recent years. These contributions have given us death *rates* according to occupation or occupational groups; from this type of information more reliable conclusions can be drawn than from the earlier data which consisted largely of proportionate mortality statistics, *i.e.*, the percentage of deaths from any given cause classified according to age at death and by occupation of the decedent.

Mortality statistics afford important information concerning the effect of several factors on longevity. Among these may be listed the influence of age, sex, marital status, climate, social-economic class, and occupation. The interpreter of these data must guard himself against indulging in dogmatic assertions, for often only tentative conclusions are warranted from the facts dealt with. Since certain broad classifications may conceal the influence of other, more potent factors, one must confine the discussion of certain points merely to the implications of the statistics. We do not yet have adequate statistical information for evaluating the effect on health of a large number of specific conditions, especially those constituting occupational environment, to warrant very many positive assertions.

The time is not far off, however, when a more adequate basis will be afforded for conclusions in regard to the effect of the working environment on the health of the worker. Fairly detailed studies of the particular conditions constituting occupational environment are in the offing. For example, both morbidity and mortality records covering the same groups of industrial workers are in preparation for tabulation as one phase of the national health inventory being undertaken by the Public Health Service. About 400 corporations representing approximately 70 different industries have coöperated in this work. Records of disabling sickness and of mortality during the 5 years, 1930 to 1934 inclusive, have been transcribed in approximately 450 plants employing more than 550,000 persons. Data on disability and death were obtained from industrial sick-benefit associations and from companies or their insurance car-

* Read before the Industrial Hygiene Section of the American Public Health Association at the Sixty-fifth Annual Meeting in New Orleans, La., October 23, 1936.

riers, in which group health and life insurance policies are in force. In addition, in most of the plants from which these records were obtained, surveys were made of the occupational environment and of the potentially harmful materials and by-products handled. Sickness rates according to nature of illness and the mortality from specific diseases will be ascertained for different occupations, and for persons regardless of their occupation who were exposed to silica dust, to carbon monoxide, and other toxic gases, to lead compounds and to various other industrial poisons.

The effect in terms of morbidity and mortality will be studied for exposures to great heat, wide temperature changes, extreme cold, high humidity, excessive noise and vibration, daily contact with crowds, and certain other environmental conditions to which a multitude of employments subject the worker. It is expected that such information will broaden our knowledge of the problems in industrial hygiene, and that some light will be shed on questions which have been pigeonholed for lack of data in such form as to permit evaluation of the effect of work and the working environment in terms of illness and mortality. It was hoped that the results for at least one industry could be given at this time, but that hope appears now to have been based on excessive optimism. However, discussion of the more general influences should precede consideration of particular conditions which affect health adversely.

INFERENCES FROM URBAN AS COMPARED WITH RURAL MORTALITY

It is difficult to measure and evaluate the effect on health and life of a number of obviously important factors. In most of our data, it must be admitted, genetic, industrial, and social factors are hopelessly intertwined. But when the rates of morbidity or mortality are much lower in a group not exposed to any known health hazard than in another group which is subjected to environmental conditions suspected of being deleterious on the basis of present knowledge of disease etiology, the tentative conclusion seems warranted that the difference in the rates probably reflects the effect of environment to a greater extent than hereditary or genetic differences in the groups under comparison.

A choice of this sort has to be made in the interpretation even of such relatively simple factual information as is afforded by the differential death rate of the two sexes. In popular articles the statement sometimes appears that the higher death rate of males than of females is evidence of an inherent biological inferiority of the male. Such an implication might be considered as good as any other if further analysis of mortality data were impossible. However, when death rates are shown according to sex for rural areas only, one finds that marked sex differences in mortality do not often appear. In urban areas a striking contrast in the mortality of the two sexes is frequently revealed. From these results one can scarcely escape the inference that occupational environment under urban conditions rather than biological inferiority of the male accounts for the higher death rate among working men than among women of the same age occupied chiefly with the duties of the home and the care of children.

The higher death rate from tuberculosis in urban than in rural areas is particularly suggestive of health hazards associated with urban industrial conditions. Sydenstricker computed the tuberculosis death rates of males and females at different ages for urban and rural areas.[1] The tuberculosis death rate for urban wage earning males, especially in middle age, after they had

been at work a number of years, was found to be considerably in excess of the corresponding rate for urban females, rural males, or rural females. Yet the urban females, living in the same economic, social, and home environment did not die from the disease to nearly the extent that their wage earning husbands did.

As to what particular conditions of the occupational environment of urban males are responsible for the excessive mortality from tuberculosis and from certain other diseases, we do not know, except in a comparatively few instances, and will not know until more detailed statistical data are obtained. It is important that we ascertain as well as we can approximately what proportion of the male excess mortality is caused by specific occupational hazards and what proportion is due to indirect causes, *i.e.*, the conditions of life to which employment in various industries subject the workers apart from direct occupational risks. To some extent both influences doubtless are at work in almost every case, but this consideration should not deter us from collecting and analyzing data which might shed light on the relative importance of these and possibly other factors of significance.

THE MORE IMPORTANT GENERAL FACTORS AFFECTING MORBIDITY RATES

Experience in the collection and analysis of industrial morbidity statistics has indicated that several factors in addition to the age and sex distribution and the racial composition of the groups under comparison should be taken into consideration. Among these may be listed: (a) marital status (particularly that of female industrial employees), (b) extent of addiction to alcoholic stimulants, (c) length of the working day or week including extent of part-time employment, (d) the type of workers from a physical standpoint who live in the community and from which industry draws its labor supply, *i.e.*, whether a preponderance of sturdy, robust workers such as are frequently found in steel manufacturing centers or the more frail, anemic type which tends to concentrate in communities which afford a multitude of light employments, and (e) finally, the self-selection of workers for particular jobs for which they are physically fitted—largely a trial and error procedure—reflected in the sickness rates according to duration of employment in any given occupation.

CLIMATE

It will be observed that the influence of climate was not included in the list of the more important general factors affecting industrial morbidity rates. From this one should not infer that the effect of climate should be minimized, nor that comparisons of sickness rates are valid regardless of locality. However, the importance of climate is often given greater weight than seems warranted from the implications afforded by morbidity and mortality statistics. In a study of the incidence of respiratory diseases among college students and in the families of medical officers of the army and navy made several years ago by the Public Health Service, the existence of pronounced synchronous variation was rather definitely indicated in the incidence of respiratory affections in localities as widely scattered as San Francisco, New Orleans, Chicago, Boston, and the District of Columbia.[2] Dublin's studies show that the expectation of life does not appear to be affected to any great extent by the differences in climate encountered in the United States. For example, the 3 states of Maine, Tennessee, and California which, of course, are widely scattered and differ appreciably in climate, have virtually the same life expectancy.[3] The explanation appears to be that given

by Alexis Carrel that our body is extremely robust; it adapts itself to all climates.[4]

MARITAL STATUS

Coincident with the tendency to overemphasize the importance of climate, is an apparent lack of appreciation of the effect of marital status on health and longevity. The death rate of the single, and also of the widowed and divorced is from 20 to 100 per cent greater than that of the married, age for age among either sex, with the exception of married women in the earlier years of the child bearing period.[5] This phenomenon is not confined to the United States, but is revealed also in the mortality statistics of France, Prussia, and Sweden.[6] In part it may be explained by the tendency of persons having serious physical impairments to refrain from marriage. But a factor of selection of this sort does not account adequately for the high death rates of widowers, widows, and divorced persons. Inasmuch as the marriage rate decreased during the years of the depression and up to recent months, the death rate over the next few years may reflect the effects of an abnormal proportion of single persons in the population.

Industrial morbidity statistics also are affected by the proportion of persons in each marital category, among women at least. Among female industrial employees the health of the married appears to be worse than that of the single. In a study based on the equivalent of 13,700 women under observation for 1 year, the frequency of disabling sickness was found to be 31 per cent greater among the married than among the single women on the factory pay roll after adjusting for age differences.[7] In frequency of serious cases, the difference in rates was even wider. The causes of such disparity in the incidence of serious morbidity among married as compared with single women in industry need further study on the part of industrial physicians and health officers before definite conclusions can be drawn and suitable remedial measures instituted.

SOCIAL-ECONOMIC CLASS AND COMPONENT OCCUPATIONS

A study of the death rates by occupation based on data of the U. S. Census Bureau for the year 1930, edited by Jessamine Whitney, has supplied much needed information on mortality in this country according to social-economic class and certain component occupations.[8] Of the 7 social-economic groups considered, agricultural workers showed the lowest standardized death rate. Definitely greater mortality rates were found for the other social-economic groups, with higher and higher levels of mortality in the following order: professional men; clerks and kindred workers; proprietors, managers and officials; skilled workers and foremen; semi-skilled workers; unskilled workers. The death rate among unskilled workers was more than 100 per cent in excess of the rate among agricultural workers.

These findings are extremely suggestive of the effect of certain conditions on the vitality of occupied males. The relatively high death rates of the skilled, semi-skilled, and unskilled workers doubtless reflect the serious nature of the accident and health hazards which the industrial revolution initiated and against which adequate safeguards have not yet been instituted. The bare facts bespeak the need for the extension of industrial hygiene measures.

They indicate also that low death rates need not wait on the attainment of a greatly enhanced national prosperity. The usual concept of affluence is not described by the economic status of the average farmer. Clerks have a

lower rate of mortality than the proprietors, managers, and officials who employ them. Both in England and the United States the death rate of ministers and preachers is almost as low as that of agricultural workers.[9] In general, the ability to purchase good medical care appears to be of less importance than a mode of living and a type of occupation which afford the necessities of life from a biological standpoint.

We may well ask what these necessities appear to be. Corroborating the inferences made from mortality statistics, a recent report on incapacitating sickness in the insured population of Scotland reveals an extraordinary freedom from disease among fishermen, shepherds, gardeners, and foresters.[10] The contrast is striking when these rates are compared with the morbidity experience of the coal miners of Scotland, for example. As to the biological necessities which agricultural and pastoral pursuits appear to provide, a tentative list of items probably should include adequate exposure to sunshine, fresh air, and moderate physical exercise, the absence of strain and hurry, and relatively little anxiety due to economic insecurity. In order to simulate these conditions as much as possible in modern industrial employments, steps would have to be taken to provide clean air in mines and factories, additional safeguards against exposure to industrial poisons, toxic gases, and wide temperature changes, noise abatement, intensified efforts in plant safety, extreme care not to overdevelop stretch-out and speed-up systems, methods of eliminating long periods of confinement at desk or bench, and measures to allay the mental turmoil and anxiety rooted in the consciousness of economic insecurity.

ECONOMIC ASPECTS OF THE PROBLEM

It may be argued that the attainment of such objectives is impossible for financial reasons. Before drawing conclusions, however, one should consider present-day expense chargeable to accident and health hazards in comparison with expected savings in operating costs resulting from their control or elimination. Pending damage claims for diseases of occupation are now estimated to be approximately 500 million dollars. A number of companies are finding that the compensation insurance premium is not an insignificant item in the overhead. The output of employees having diseases of occupational origin probably is considerably less than that of able-bodied men.

In a recent study it was found from exercise tests, designed to measure capacity for work, that 12 to 64 per cent of the men in the different groups exposed to a dust hazard showed decreased capacity for work in comparison with only 10 per cent of the men at the same ages who were not appreciably exposed to dust.[11]

A recent estimate affords the conclusion that a competent factory physician devoting his skills to the preventive as well as the curative aspects of industrial medicine, with his services paid entirely by the employees of a business concern would in a few years cost the workers no more than they now spend on the average for medical care without getting a fraction of the service usually rendered by a full-time physician in the plant.[12] This estimate was based on an industrial group of 1,200 to 1,300 persons. Findings of this sort suggest that industrial morbidity and mortality rates may be needlessly high, more from inertia and the failure to make use of organizing talent and salesmanship in the field of industrial hygiene, than from real inability to finance health protective measures. In other words, the obstacles *may* be more largely of a mental than of a monetary nature.

SUMMARY

Rates of sickness frequency and of mortality in various groups of the population afford inferences concerning the effect of different environmental conditions on health and longevity. The implications of the statistics do not always substantiate prevailing impressions. It appears, for example, that good health and long life are not dependent to any very important extent on climate, at least in so far as its variations within the United States are concerned. Mortality data indicate that man is less adaptable to certain other conditions of life, such as celibacy, and to the mode of living and occupational exposures incident to our industrial civilization.

In general, the lowest sickness and death rates among males are found in the agricultural and pastoral pursuits which apparently afford the necessities of life from a biological standpoint to a greater extent than certain other more highly paid occupations such as those in the professional and proprietor groups. The relatively high sickness and death rates found among the skilled, semi-skilled, and unskilled workers in industry indicate a need for the extension of industrial hygiene measures. Tentative estimates indicate that savings obtainable through the elimination of occupational health hazards would to a large extent offset the cost of providing more adequate health protection for industrial workers. Industrial medical service, for example, even if financed by employees, could reduce the amount of time lost on account of illness so that the net cost to the workers would be no more than they now spend on the average for medical care.

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Engineering Aspects of Malaria Control by State Health Departments*

GEORGE H. HAZLEHURST, C.E., M.C.E., F.A.P.H.A.
Chief Engineer, State Department of Health, Montgomery, Ala.

IN malaria control we recognize that (1) the disease is confined to certain endemic areas; (2) that the areas of *Anopheles quadrimaculatus* production vary from temporary pools to lakes and swamps many square miles in extent; (3) that these areas are not distributed regularly or uniformly over either the state, or a given county; (4) that certain counties contain more breeding areas than others; (5) that the extent of breeding and character of breeding may vary from year to year; and (6) that the power of transmission and length of transmission season show yearly variations.

It is acknowledged, also, (1) that the only positive control measure is elimination of the vector, and that drainage which dries the breeding area is necessary for complete and permanent effectiveness; (2) that where positive drainage is not attainable, suppression of the vector by larvicides can be considered; and (3) that where these primary methods are not applicable secondary measures may be used in the form of screening, house spraying, drugs and natural enemies; these methods being recognized as effective in the order presented.

In considering a state policy it appears rational to divide malaria into two classes: (1) that which may result from man's construction activities; and (2) that which results from natural conditions.

A consideration of Class 1 leads to the conclusion that by guidance and regulation malaria may be prevented to a large degree from being augmented and built in. A consideration of Class 2 leads to the conclusion that regulation cannot be made to apply generally, and any change can be made only as human needs and ability dictate.

In Class 1 may be included cities and towns, camps and industries, railroads and highways, forest destruction and clearing, dams for water impoundage for power, for water supply, for fish propagation and other uses, and other construction activities, as canal construction, irrigation, sub-drainage, etc.

Cities and towns lend themselves readily to analysis and planning for control campaigns as well as the prevention of structurally created breeding areas. The municipal area with all breeding hazards may be surveyed and mapped. The construction costs and other costs of control can be determined. Not only is this true of malaria control, but for mosquito species control as well. The municipality can then be given full information upon

* Read at a Special Session on Mosquito-borne Diseases of the American Public Health Association at the Sixty-fifth Annual Meeting in New Orleans, La., October 23, 1936.

which to base its action. Its decision would rest, as a consequence, upon the firm foundation of benefits to be secured per dollar spent—a no mean consideration, as is well known.

Camp and industrial sites may be analyzed similarly and the question answered as to whether the site is worth selection. The cost of seasonal or permanent control might make the location an economic hazard.

Railroads and highways lend themselves during planned construction to an analysis on the basis of cut and fill costs and the importance of location of possible made breeding areas. From time to time on old construction the embankments in place must be altered to accommodate drainage developments, or old breeding areas must be filled or drained.

Forest destruction may largely be guided, especially as to stream channel blocking.

Dams for impounded water may be regulated. They may be designed with reference to malaria control facilities built into them. The areas may be cleared with special reference to malaria control and maintenance operations planned. The costs can readily be determined and the benefits estimated. As part of the construction costs, labor protection can be computed. All specifications can be clearly drawn and the work definitely planned.

The technic changes with the consideration of these various activities, for manifestly the instrument surveys of watersheds and channels with their design for maximum and minimum runoff would not apply to all works. Whether such channels would be excavated by the use of one of the several types of machines, by dynamite, or by hand would be an entirely different problem from the dam design and timber removal of an impounded water project. Municipal control would hardly call for consideration of marine equipment and transportation as on a hydro-electric development.

Success has largely attended control efforts of problems presented by man's construction activities.

In Class 2 may be included swamps, lakes, river systems, silting, storms, and other natural conditions and effects.

Success has been relatively rare within the second class of natural causes.

While the United States is large, and detailed maps have been made of certain areas, it remains unmapped as a whole. The same is true of the malaria problem. The areas are so large and the funds so meager that few have attempted it. Yet this appears to be the first step to an intelligent approach. This statement has special significance with reference to specified counties where the financial outlay for such work would give promise of justification. An engineering survey would lead to the possibility of cost analysis of the whole, by sub-divisions, or by specific projects. It would at once determine the policies and the practices of the health organizations. So long as these organizations do not know what it is necessary to do, how to do it, what the cost will be, or what benefits can be expected for the dollar expended, just so long may we look for relatively unrelated and meager results in this great field.

The problem of highways and the problem of education have not been solved through individual effort alone, but upon the basis of group action. It would seem that many phases of the malaria problem bear a similarity to these other common problems.

Engineering in the control of malaria, as conducted by state health departments, reduces itself to administrative vigilance, a mastery of construction and organization technic required by the

various physical conditions encountered, and what field demonstration and control work can be accomplished by the personnel available. That it has not had greater accomplishments is due to the limited personnel employed by the state and county to work on a problem of such great magnitude. If wider use of these services cannot be economically justified in all instances, there yet remain instances where the justification is undeniable. It rests with those responsible for health administration as to whether such services will or will not be employed in their attack on the malaria problem.

An Editor's "Heart to Heart" Talk

IT reached the point recently where a medical editor in the Southwest felt that he must tell the doctors who were sending in scientific articles for his pages a few things good for their souls. He took his pen in hand and wrote the title, "Our Duty." Then he said, "This is a busy world." Time is precious, life is short. So he comes out flatly without mincing any words, and declares that "the writer who uses an excessive number of words in putting over his message is a robber of his reader's time and a confrère's right to get his message into print. He robs himself also of prestige because his lengthy article has few readers as compared to those his shorter article would have."

It seems that the editor has been doing some plain and fancy cutting, and has perhaps "stirred up the animals," as he says:

It is not unusual for us to delete sufficient words from an article of 12 to 14 pages to reduce it to 6 to 10 pages with nothing being omitted except unnecessary words. From other articles we are able to delete relatively few words. Our deletions are in inverse ratio to the care and time an author spends upon his paper. A year or more ago a certain author submitted a paper from which we deleted perhaps 25 per cent of his words. This year he submitted another paper and the deletions were negligible. We probably save enough space of each issue to publish perhaps two short papers that would otherwise be crowded out.

In the main our contributors have expressed themselves as appreciative of the vast amount of time we have spent in editing their articles so as to get their ideas across in the fewest possible words. Occasionally an author has said to us in effect, I wish my paper published exactly as I wrote it. Such an author certainly does not understand the problems which confront us.

In confirmation of the editor's contention, we have presented his main points in about half the space that he required.—*New York State J. Med.*, Feb. 1, 1937, p. 314.

EDITORIAL SECTION

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THE CHANGING PICTURE OF TUBERCULOUS INFECTION

A BODY of authentic data is slowly accumulating which will compel us to change our conception regarding the universality of tuberculous infection. Less than a generation ago the studies of various European physicians led to the conclusion widely quoted that approximately 90 to 95 per cent of persons in urban communities were infected with the tubercle bacillus by age 20. Even today this statement in some guise or other recurs in many articles on tuberculosis.

However, the continuing sharp decline in the tuberculosis death rate, which in the last generation has decreased to a little more than one-fourth what it was over 3 decades ago, has led to searching inquiries as to whether lessening of infection has kept pace with lessened mortality. These inquiries began about 10 years ago and then there were only " straws " to show that the infection rate was lessening. Several noted writers at that time made guarded statements such as, " I am inclined to believe that children with tuberculous infection are becoming fewer." Or again, " It has been my impression . . . that in recent years the number of our reactions is becoming less."

In 1926, at Framingham, Mass., a comparison was made between the percentage of positive reactors among children tested that year with the corresponding figure for 10 years previous, which showed that there had been a considerable decline. From that time on the accumulating data on the subject have become more than " straws." The recent development of a standard tuberculin for testing, with a standardized technic for administering it, and an increasingly wide use of tuberculin testing of children as a means of case finding in tuberculosis, has furnished comparable data on this whole subject. A recent compilation of group tuberculin testing throughout the United States disclosed the fact that over a million individuals, largely school children, had been tested. The percentage of positive reactors varied from 4.6 per cent in South Dakota, to 51.7 per cent in Virginia. In states

without large Negro populations the highest percentage of reactors was 32.4 per cent in Wyoming, the latter figure, however, based on very small numbers.

A recent carefully controlled study, not yet published, of 57,000 individuals tested with P.P.D. (purified protein derivative) shows percentages of 25 for children under 5; 22 for children 5 to 9; and 28 for those aged 10 to 14. Even for the 15 to 19 group the percentage is only 32.

So far as the evidence is available, the decline in infection among children has taken place almost equally at all age periods with an increasing percentage of reactors after age 1 up to age 20.

What has brought about this decrease in infection at the younger ages, and what does it presage? Unquestionably the decline in the mortality rate and its corollary the morbidity rate, or, vice versa, with the lessening of the chances for infection through isolation of cases, accounts for most of it.

We are greatly indebted to Dr. Beaven of Rochester for a recent article summarizing the infection figures and making comparisons between earlier and more recent studies. In 7 areas, studies of tuberculous infection in children after intervals ranging from 3 to 15 years, showed total declines of from 11 per cent to 62 per cent.

While the infection figures are sketchy and the mortality figures approximately complete, it seems reasonable to suppose that infection has a fairly fixed relationship to mortality and that the radius of infectivity, either by direct or casual contact of an infectious case, has not changed greatly from the horse and buggy days, even with modern transportation facilities and opportunities for foregathering in great numbers.

There seems also to be a more or less fixed ratio of those actually acquiring the disease to those who die of it, since this figure has changed very little in the last decade, if we can trust the official data. The ratio of new reported cases to deaths from tuberculosis each year remains between 1.5 and 1.6 to 1. So we have the picture of a consistently declining mortality rate, a corresponding decline in both morbidity and infection rates, and all 3 are declining in all age groups and in both sexes although not always at the same pace.

What of the future? Some writers, notably Coutts of England and others have held that the decline in infection in childhood will lead to an increase in the mortality of the disease in young adulthood. Recently, A. Bradford Hill, writing in the *Journal of the Royal Statistical Society*, has endeavored to test this hypothesis statistically, using official English figures. His conclusion states: "In general the statistical evidence available (admittedly slender) does not suggest that the level of the phthisis death rate amongst young adults in different areas of the country is materially due to different degrees of immunization in childhood." This is the conclusion of a single study and others are needed in our own country before a satisfactory answer to this question can be reached.

THE BRITISH MEDICAL JOURNAL

WITH the first issue of 1937, this famous journal has appeared in a wholly new dress, exactly 80 years after it assumed its present name. The Provincial Medical and Surgical Association, founded in July, 1832, published a *Volume of Transactions* from 1833 to 1853, the last 11 volumes of which were overlapped by those of the *Provincial Medical and Surgical Journal*, a weekly

which appeared first on October 3, 1843. This publication was the direct ancestor of the present *British Medical Journal*. In January, 1853, the name was changed to the "Association Medical Journal," and on January 3, 1857, the present name was adopted.

Special committees have for many months past been considering a change in the typography and lay-out of the *British Medical Journal*. The change in type has been to help the reader and the reader's eyes. It is the product of some years of experiment in Printing House Square; was subjected to severe tests; and then adopted by the *Times*, which for our cousins across the sea seems to be the last word in pretty nearly everything that is correct in printing. In addition to an editorial, this number of the *B.M.J.* carries almost two pages discussing the change, and one column explaining its adoption of the Harvard System of Bibliographical Reference to scientific literature, and the proper abbreviations for periodicals.

The *Lancet* appears in its old form for 1937, but has "A Word to Contributors," in which the growth of scientific journals is likened to the changes in animals and plants, who tend to become less and less like their cousins. "They grow different in appearances and they eat different food."

The Publication Committee of the Royal Society has been trying to devise "a basal diet" that all will accept, and has asked editors in England to give up some of their peculiar fads and adopt the Harvard System of Bibliographical Reference, with such local modifications as may be necessary. This the *Lancet* has done, and as a Supplement, has included a leaflet on "Writing for the Lancet," from which very soon we will give extracts, hoping to improve the type of manuscript which comes to this *Journal* from its contributors. Some of the things noted in this leaflet have already appeared in our editorial pages.

Evidently British editors suffer as do their American confrères. In spite of the charge—correct we believe—that most of us in this country are flamboyantly American, it is only truth to say that on the average those who write for English periodicals are better trained in the use of English than are our writers in this country. This also applies to the editorial staffs. To better trained editors, faults of diction must cause greater pain than is experienced by those not so proficient.

Under the leadership of the Royal Society and with the backing of such journals as the *Lancet* and *British Medical Journal*, there is little question that the English of periodicals will improve as well as their make-up. Is it too much to hope that the journals of America will follow the lead? English is a wonderful language. It contains every word necessary for the clear expression of ideas. While in some ways a little more cumbersome than the facile French, it is still, with very few exceptions, adequate for all needs. Clear ideas readily find words in which they can be expressed succinctly, soundly, and simply.

LARGE CITIES MAKE PROGRESS IN SEWAGE TREATMENT

ADEQUATE removal and treatment of water carried wastes from a large metropolitan area presents many difficulties but the ones hardest to solve have been where and how to secure the large sums of money needed to bring well designed works into being.

Prior to 1934, progress in this field on the part of large cities had been painfully slow but since then the achievements are commendable.

In the September, 1936, issue of *Sewage Works Journal*, Mohlman points out editorially that this rapid progress has been possible mainly because of Public Works Administration loans and grants. The evidence seems to confirm this and we should, therefore, credit to these subsidies the solution of the principal problem which city officials faced when public opinion demanded action for cleaner waters.

Some of the advances in the sewage treatment field made and underway are worthy of comment. The largest sewage treatment plant under construction in this country is the southwest side works of the Chicago Sanitary District. It is an activated sludge plant, with a capacity of 400 m.g.d. which may be extended to 600 m.g.d. It will go into operation in 1937 and will probably for many years hold the " Blue Ribbon " for size of activated sludge plants for the world.

New York's 200 m.g.d. activated sludge plant on Wards Island should also be in operation in 1937. This plant will cause a major improvement in the sanitary condition of the East and the Harlem Rivers. In addition, New York now has a 30 m.g.d. chemical precipitation plant in operation at Coney Island.

A sedimentation plant, nearing completion at Washington, D. C., is designed to relieve the pollution of the Potomac River. This plant is noteworthy for the pioneer installation, on a large scale, of elutriation of digested sludge prior to partial dewatering on vacuum filters.

The activated sludge plant known as the Easterly works in Cleveland will soon go into operation, and the designing of the Westerly works is under way. These two, with the Southerly works, will complete Cleveland's sewage treatment program.

The Columbus activated sludge plant is the second largest in Ohio. Buffalo and Detroit are preparing to build sedimentation plants with effluent chlorination. Bacteriological efficiency will be of paramount importance in both to protect downstream water supplies. The Minneapolis-St. Paul project is of outstanding interest because of the choice of sedimentation plus chemical treatment in place of activated sludge for disposal in rather limited volumes of diluting water. Somewhat similar to the Minneapolis-St. Paul works is the chemical precipitation plant now ready for construction in Denver. It is noteworthy in having adopted magnetite fillers for final clarification of the effluent. Milwaukee and Indianapolis have greatly enlarged their activated sludge plants.

On the west coast, Los Angeles County is proceeding with the construction of a tunnel to carry settled effluent to sea, and San Francisco has started a small sedimentation plant in Golden Gate Park.

In Canada, Winnipeg is building sewage treatment works where it is reported a large number of comminutors will be used. The North Toronto plant has been enlarged and Montreal is designing sedimentation works.

There still remain a few large cities in which some action toward sewage treatment would be desirable. Those on the Ohio River have the greatest incentive to move forward inasmuch as they use the river as a source of water. Others, on the Mississippi River, still assume that the river is adequate for disposal purposes. When will necessity or pride stimulate favorable action and progress in those localities?

Letter from Great Britain

NINETEEN THIRTY-SIX A NOTABLE YEAR

In general the feeling at the close of 1936, so far as regards progress in public health in this country, was one of satisfaction. Numbers of schemes and activities had so shaped themselves that legislation to regularise them and bring them formally within the general routine could be brought into operation, and the various administrative bodies left to see to it that they worked effectively. The year 1936 was quite a suitable one to choose for these purposes since it marked the end of a hundred years' stretch that began with the accession of the girl Victoria to the Throne, and that has seen most marked and wonderful changes and a degree of progress in relation to, amongst other things, the national health that none of the very many active for social reform in that day could possibly have foreseen.

It is particularly appropriate that in 1936 an Act more or less completely consolidating health legislation should have been placed upon the Statute Book. That the year should be that in which it was found possible to see the way to a solution of problems connected with the housing of the people so clear that one Act of Parliament would be adequate was fitting also.

For a very long time the housing question had been more or less fenced with numbers of people apparently nourishing the belief that all that was needed to produce houses and homes for the working and poorer people was talk that only legislators and lawyers could make, and that they and none other could hope to understand. As a fact, from the middle 80's of last century up to more or less the present time, the spate of housing legislation in this country has been particularly ceaseless. That it was because of what the bulk of it said, the population in general was roused to demand a remedy for the many defects in connection with housing is possible. It is just as likely, however, that it was the volume of the law that appalled them and the fear that if the law makers were not stopped they would become so immersed in legislating about housing they might forget entirely why they were legislating.

The popular demand for deeds rather than words, first heard only a few years ago, has led to results so wonderful that at the end of 1936 the Minister of Health found himself in a position to declare that by 1939 the work of replacing slums by proper healthy homes and passing the people from one to the other would be completed.

More or less coincidentally, the problem of overcrowding, which it seems was only seriously tackled the other day, will be solved also, sufficient accommodation being available in all areas to ensure that—in the phrase of a recent ministerial publication on the subject—any occupier who is unfortunately living in overcrowded conditions is found a house "of a suitable size, suitably situated and suitably rented in which he and his family can lead a healthy and comfortable life." A noble aim, proper indeed as a resolution at the beginning of a new year.

A SALARIED SERVICE OF MIDWIVES

Another direction in which 1936 saw a definite move forward was towards securing great improvements in the midwifery service of the country with the provision of skilled attention for every woman at childbirth. These are broadly the aims of the Midwives Act, 1936, and with every authority concerned in the matter ready and willing to make provision of a salaried service of midwives it should not be long before there is everywhere throughout the country a smoothly running scheme such as is envisaged by the Act. Noting the readiness with which the idea of such a provision as this has been accepted by the country, one is surprised that the introduction of the arrangement has been so long delayed. Just as one is surprised, now that its solution is taking place, at the hesitation in tackling the housing problem, and will be later on in the case of other problems that, at the moment neglected, will be rapidly removed from the problem class when strongly attacked with the approval of the people not earlier expressed because not earlier sought. Probably it is the same everywhere, but here the number of people who have their finger on the public pulse who are incapable of taking or interpreting a pulse is astounding. People conceivably are funny but they are not so funny as all that or their behaviour in crises so frequently has shown.

THE CHIEF MEDICAL OFFICER'S REPORT

Amongst problems that in all probability the people would not seriously object to seeing strongly attacked, I believe, is that of the venereal diseases. It is the case, of course, that there are schemes in operation generally throughout the country, that they are fairly efficient, that they become more and more closely linked up with other branches of the public health service, and that sufferers resort quite readily to the various treatment centres. Probably also in the general conversation of the younger and brighter, thanks to the efforts of the appropriate councils, as subjects, the venereal diseases are very strongly in competition with obstetrics. Something more than all this, however, is needed. Even though Sir Arthur MacNalty—who has now been Chief Medical Officer of the Ministry of Health and of the Board of Education for 2 years or more—in his report "On the State of the Public Health" in 1935, expresses himself as not dissatisfied with the progress made and not without hope of further progress.

PROBLEM OF THE VENEREAL DISEASES

The centres in operation number 185. The returns from these, it is believed, afford reliable evidence of the incidence of syphilis. In 1935 a new low record was set up, 19,335 seeking treatment for the first time as against 20,692 in 1934. Also there has been evidence of steady reduction in the numbers of cases of congenital syphilis dealt with year by year since 1930, with evidence too of increased coöperation of the maternity and child welfare and the school medical services with the venereal diseases service in the detection and treatment of congenital syphilis. That the number of deaths amongst infants certified as due to syphilis is declining markedly is noted. The rate of 0.29 per 1,000 live births in 1935 was one-seventh of that in 1917. The fact that the cases of gonorrhea dealt with for the first time in 1935 (41,332) showed a further decrease, the figure relating to males (27,506) being the lowest since 1926, deserves mention. This section of the report, in addition to statistical information contains a most useful discussion on the incidence of late effects of syphilis and on outbreaks of gon-

ococcal vulvo-vaginitis in institutions with a description of precautions that have proved consistently effective over a period of 16 years in one particular Home.

Anxiety in relation to disease problems other than those relating to the venereal diseases to which the report makes reference include those touching cancer, rheumatism, tuberculosis, and diabetes. The section dealing with the first named contains a number of figures of serious import, and comments upon the position generally and in regard to prevention and control, less optimistic than could be wished. In spite of the fact that they are qualified by a statement to the effect that it is "unnecessary and probably quite fallacious to assume that the increased frequency of the disease connotes a corresponding greater prevalence of whatever factors are concerned in causation" it is disquieting that the number of deaths ascribed to cancer in 1935 was 64,507, or 1,244 in excess of the previous year. Further, there is real cause for anxiety —and if it were properly grasped by the population at large it would lead to demand for the adoption of more active measures and more intensive investigation—in the fact that the number of persons requiring treatment continues to become steadily larger and that, in the words of the report, "the preventive field, so far, remains unhappily restricted, limited as it is to those cancers which have been recognised as due to certain environmental conditions, chiefly occupational risks."

RECORD FIGURES FOR TUBERCULOSIS

In regard to rheumatism and tuberculosis and, to a lesser degree, diabetes, the pronouncements are rather more cheerful. The mortality rate in 1935 for rheumatic fever—29 per million—is the lowest recorded for any year save 1932, when it was 28 per million. An estimate is made that rheumatic diseases cause approximately 16 per cent of the total sickness and disablement due to all diseases in insured males, and 14 per cent in females. In a number of areas very active work is done on behalf of child sufferers particularly, and there is great praise for the efforts of the British Red Cross Clinic for Rheumatism and the British spa hospitals.

In the case of tuberculosis the situation shows a steady and regular tendency to improve. In 1935 there was a continuance in the fall in the number both of notifications and of deaths. Of new cases there were 55,418 as compared with 59,564 in 1934. The number of persons seen for the first time by tuberculosis officers was 89,457—927 fewer than in 1934. The number of deaths, 29,201, was 11,186 fewer than in 1925, although the population has greatly increased in the interval. Accustomed to hear that the figures for non-pulmonary tuberculosis are the "lowest recorded," it is particularly gratifying to learn that those for the respiratory form in 1935 "constitute a new low record."

So far as diabetes is concerned the notes made have reference mainly to research work done in relation to the treatment of the disease. Note is also made of the fact that investigations carried out in London reveal that, so far as can be judged from the operation of the schemes for the free distribution of insulin to necessitous persons with diabetes, the highest incidence of the condition occurs in the East London area, chiefly among the Jewish and foreign population. Enquiries among district nursing associations, indeed, showed that nearly half of the insulin work in the metropolis was concentrated in one comparatively small area served by a body known as the East London Nursing Society.

THE TOIL AND PAINS OF PROGRESS

Sir Arthur MacNalty's report, of course, covers a very great deal more ground and an infinitely larger number of subjects than have been referred to here. Most of the matter, naturally, is of interest to English readers mainly; at the same time, however, there is much in the sections dealing with general and experimental epidemiology, for example, and maternity and child welfare, the relation of food to health and disease, and even the insurance medical service, that must have a wider appeal. As indicating the importance that he himself attaches to the matter of nutrition it is worthy of note that nearly the whole of his scholarly introduction, that he heads "The Newer and Wider Interpretation of Preventive Medicine," Sir Arthur devotes to a discussion of the problems associated with nutrition and the education of the people in regard to its importance. The task of imparting information as to dietaries, he points out, was one that in 1863 Sir John Simon, the first of the line of distinguished physicians who preceded Sir Arthur MacNalty in the office of Chief Medical Officer, which he occupies with so much distinction, declared necessary to be faced. No doubt since that date there have been in this regard, as in a multitude of others, advances made that would appear astounding to Simon and those contemporary with him like Chadwick, Edward Smith and others. It may be accepted, indeed, as Sir Arthur suggests it is safe to do, that "despite increasing population, increasing urbanisation and the aftermath of a world-wide war, the standard of national health has been raised to heights undreamed of when Chadwick and Simon started their beneficent work."

For acceptance also there is advanced the final appeal made to those who complain of the slowness with which improvements in the national health take place, that every triumph of the past only followed years of toil and endeavour. One of the outstanding features of this present report, according to Sir Arthur MacNalty, is that it offers grounds upon which may be based some understanding of "the toil and pains inseparable from progress in public health and medical work." This also may be accepted.

QUI S'EXCUSE, S'ACCUSE

Which is why I refrain from offering explanation of a neglect to make any communication for so long: saying only that I hope to write more often and regularly in the future.

CHARLES PORTER, M.D.

PUBLIC HEALTH EDUCATION*

"Death Fighters in Detroit"—Detroit, in November, 1936, was the *locale* of a "rather novel adventure in health education and medical participation," to quote Chief Adventurer Henry F. Vaughan.

It all centered around tuberculosis case finding. It involved a tie-up between the Wayne County Medical Society, the Detroit Tuberculosis Sanatorium Association, the *Detroit News*, Station WWJ, Paul de Kruif, and the Detroit Department of Health.

We will give an outline of the effort as shown by the material received from Detroit.

The first move seems to have been a letter, on letterhead of Wayne County Medical Society, signed by the society, the Sanatorium Association, and the Department of Health. Among the enclosures was an "Outline of Tuberculosis Case Finding Program" from which we quote the opening paragraphs:

During the past several years the Wayne County Medical Society in coöperation with the Detroit Department of Health and other agencies has supported a number of tuberculosis case finding campaigns. It is intended, however, that the present undertaking should not be a short time campaign but should be a long term program to eradicate tuberculosis. It should be undertaken in the same manner as the diphtheria protection program. We are assured of the hearty coöperation of many professional and lay groups. In the forefront will be the newspapers. A series of special articles on tuberculosis will be published by the *Detroit News* for 12 consecutive days beginning Monday, November 9, and will be preceded by a feature story on Sunday, November 8, outlining the progress made in the control of diphtheria. Also beginning on November 9 there will be for each of 12 days a 5 minute dramatization of tuberculosis on Station WWJ. In addition to all of this, there will be a 30 minute program on Station WWJ beginning Wednesday evening, November 11, at 7:30 o'clock. These dramatizations will be broadcast each week at the same hour for an indefinite period. The *Detroit News* will open its new broadcasting auditorium with seating capacity for 340 to the medical profession. All interested physicians will receive an invitation and tickets of admission for some one of the broadcasts. Also, through the courtesy of the *News*, the auditorium is available to physicians before and after each broadcast. This will afford an opportunity for short talks describing the program. Urge your patients to read the newspaper articles and tune in on the radio.

It is the aim of this program to discover tuberculosis in its earliest stage and to provide advice and supervision so as to prevent the development of advanced tuberculosis. Minimal pulmonary tuberculosis can be discovered best by the use of the tuberculin test and X-ray examination of the chests of the positive reactors.

Postgraduate conferences, with out of town speakers, were held once a week for 5 weeks.

The newspaper announcement of the effort appeared in the *Detroit News*, Nov. 6, 1936 (a full page, with a red tb devil, firing a machine gun):

STOP THE MURDER!

It started as a simple cold. Betty Jane's mother said, "Oh, she'll be all right in a few days." And apparently Betty Jane was all right. She went back to school and resumed her studies, determined to make up the time lost during the few days she had been confined to her home.

Within a few weeks she complained of feeling tired. Her sleep was restless. Her appe-

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

tite began to fail, the ruddiness faded from her chubby cheeks and Betty Jane shunned the energetic games in which her little playmates participated.

Finally, alarmed at the pallor which persisted in her little daughter's cheeks, at her lack of appetite and loss of weight, Betty Jane's mother took her to see a physician.

"Tuberculosis," said the doctor.

"MURDER," says Paul DeKruif!

Read "Death Fighters" Starting Sunday By Paul DeKruif and A. M. Smith.

. . . Learn the truth about tuberculosis. Learn about its insidious beginning, its sinister development and horrifying grip upon its unsuspecting victims! Read how more Detroit children of 15 years and under die of tuberculosis than of any other contagion . . . how it kills three times as many young people of 20 years and under as all other contagious diseases combined! Learn how *tuberculosis can be stamped out entirely* . . . how you can protect yourself and family from the ravages of this dreadful plague.

Listen to WWJ or W8XWJ Wednesdays at 7:30 p.m.

The Detroit News

The newspaper series started November 8, ending November 20. A few headlines will help to get the story:

Physicians Storm Walls of Ignorance—Stop That Murder! Invisible Destroyer Hovers Over Detroit—Tb Stalks Its Human Quarry in Public Places—Medical Science Shows Way to Safety—Murderous Complacency

Despair, Death Lurk in a Fool's Paradise—Tuberculosis Germs Thrive in the Grounds of Outworn Beliefs and Indifference to Ever-Present Danger—Deadly Fools Paradise

White Plague Called Public Enemy No. 1—Two Kinds of Murder

Slayers in Disguise Lurking in Detroit—White Plague Thrives on Public's False Ideas of Safety; Modern Treatment Offers Only Protection—Face the Statistics

Doctors Confident in Brave War on Tb—Death Fighters Are Prepared to Prove Their Contentions if Detroit Will Provide Necessary Funds—Detroit's Tb-Fighters Are Set To Go

Lost Legion of Tb Calls for Your Help—69,000 Graves Annually Tell of Tuberculosis Tragedy in This Country; Slaughter Can Be Stopped—Money for the Fight Against Tuberculosis

Following each radio dramatization was an address given to the audience especially invited to hear that particular dramatization.

Additional material: a placard in green, purple, and white to announce "Death Fighters"; a reprint from *Detroit Medical News;* case record cards; double business reply cards (postage collect) for tuberculin test report, X-ray report, and final consultation; "Finding the Case of Tuberculosis" (pamphlet); "Diagnostic Standards" (pamphlet); map showing Detroit active cases of tuberculosis, July 1, 1935; map showing Detroit tuberculosis deaths per 100,000; a pamphlet reprint of "Death-Fighters."

Results? A "Progress Report" says in part:

On December 15, 1936, the City Council authorized the Health Department to add approximately $200,000 per annum to its budget to be used exclusively for tuberculosis case finding work. The first appropriation which became effective January 1, 1937, is for $105,770, the amount necessary to support this work until July 1, 1937, the close of the fiscal year. The new appropriations, on an annual basis, provide for the employment of 45 additional public health nurses (to be added to the 362 now employed), 12 new stenographers and statistical clerks, 2 new health educators (to be added to the staff of 9), $40,000 for tuberculin tests, $40,000 for X-ray examinations, $3,000 for postgraduate medical conferences, and miscellaneous items for transportation, private car rental, maintenance, printing, stationery, postage, equipment, etc. The program anticipates the additional expenditure of approximately $1,000,000 on this basis during the next five years. . . .

Even before the start of the field work, as a result of the publicity, 1,823 tuberculin tests were reported by physicians prior to January 21. Of this number 511 were positive and 298 (approximately 3 out of 5) have completed the X-ray examinations. From this group there have already been discovered 27 active cases of tuberculosis, most of whom are already hospitalized. It is anticipated that as soon as the intensive work begins results will be more striking.

An outgrowth of the Detroit campaign was an article, "It Costs Us Money to Die," in the February 1937 issue of *Country Gentleman*, Philadelphia, Pa. A large page pamphlet, "How Tb can be wiped out in your community," prepared without the knowledge of the Detroit Department of Health, was widely distributed by *Country Gentleman*. After a number of glaring errors had been corrected, an edition of 125,000 was printed for distribution to tuberculosis workers and others. Here is a part of one page:

Tuberculosis Can Be *Completely* Wiped Out

If you think tuberculosis *can't* be gotten rid of you are not fully informed. All you have to do is to utilize the present knowledge of medical science.

1. Organize your community. THEN

2. Use the magic eye of the X-ray to find the infected people at the early, minimal stage of their sickness.

3. Get these death-sprayers out of circulation. Prevent them from sprinkling the White Plague upon others.

4. Cure them with the help of the wonderful new "lung-rest" treatment. Give their lung cavities a chance to heal permanently.

The job is simple. The cost is ridiculously small. *And Detroit shows the way.*

Why the "Drive"? — Asked by F.P.A., the stimulating columnist of *New York Herald Tribune:*

In Saturday's papers it was announced that a drive to end smoking and spitting in the subways and other transportation lines would be started soon by the Department of Health. Why "soon"? Why not this morning? Why the "drive"? Why is there always a "Drive" to enforce already existing ordinances? Why the excessive tolerance and delay? It is largely because there is no vigilance in enforcing laws and ordinances that the public, of which murderers and kidnappers are members, has contempt for laws and ordinances.

"Give the Public What It Wants" —"Judged by its nearly 2 million sale to a highly intelligent public," says *Publishers' Weekly* (62 W. 45th St., New York, N. Y.: issue for Jan. 2, 1937), "*The Reader's Digest* is one of the most successful of recent attempts to provide the public with the kind of reading matter which it wants and is willing to pay for."

The Reader's Digest has discovered an audience, until a few years ago unimagined, that seeks not so much to be idly entertained as to be informed. The existence of a small group of such persons, generally regarded as the intellectual carriage trade of the magazine and book field, has been admitted all along. The revelation that the *Digest* makes, however, is that this group is neither small nor queer, but that it is enormous and normal, and it behooves all of us whose traffic is reading matter to treat the public with respect. Before the rise of the *Reader's Digest* no one dreamed that a magazine of serious content devoted strictly to general articles could ever rise above 200,000 circulation under optimum conditions. The *Digest* has upset once and for all the theories and calculations based on giving the public what it wants and assuming that what it wants is low-life.

What it all means in health education we don't attempt to state, but—

The success of the *Digest* is not so much a vindication of a publishing idea as it is a revelation of the reading tastes of the American public. The *Digest* has discovered the immense drawing power of ideas. It has found serious reading matter to be good box office. It has discovered more than a market: it has found a mood, an appetite, which if properly cultivated, might change the reading habits of a nation and be used to enlarge beyond the present fondest conception the demand for books and magazines of serious import.

Possibly our lesson is in this further quotation:

Among other things the *Digest* has found that the public is not reverent toward big names. If two articles come up for use—one by H. G. Wells, but dull, and the other by an obscure nobody, but well turned, of fresh interest, alive in content, the *Digest* never hesitates. It lets the big names go hang and puts the emphasis on content and ideas.

Telling What You Like or Don't Like—Newspaper and magazine editors

are responsive to the opinions of their readers.

As readers we are more impressive and influential than we are as health workers.

Editors of some women's magazines need to hear from the readers. Especially should they check articles which have appeared in 1936 on maternal deaths.

Check and communicate—and we may contribute toward checking the flow of inaccurate, highly colored, and wildly emotional health articles.

Check and communicate!

Are We Helpless Without "Tion"? — A "Constant Reader" writes:

> How about a note some time on the public health worker's everlasting use of—
> Integration
> Coöperation
> Coördination
> Orientation
> (and several more).

And now what have other "Constant Readers" (if any) to say on the subject?

A New Approach Needed—Again we get a "Plea for a Scientific Approach to the Traffic Problem," this time in a paper under this title presented by N. L. Burnette, Metropolitan Life Insurance Co., Ottawa, Ontario, at the First National Safety Conference, and published in *Municipal Review of Canada*, Lachute, Quebec, Jan. 1937. Mr. Burnette considers various physical and psychological factors in car accidents: left handedness, color blindness (affecting distance judging), etc., along with teaching methods and

> . . . differences in intelligence levels as well as variations in racial, social, and age-group psychology affecting capacity or inclination to learn. . . .
>
> Propaganda based on sentiment or fear is probably less successful than an appeal to common sense. The point to remember is, that what will work among one type of individual may produce negative results with others.
>
> We do not know to what extent driving habits are affected by windshield stickers, safety club insignia, booklets, newspaper articles, radio talks, or moving pictures. We use all these media of instruction without attempting to determine their comparative values or how the degree of success varies with different groups. Certainly, the net results hardly justifies complacency. The need is not for increased material, but rather for an honest auditing of our business. . . .

Two pleas for the scientific approach have now come from this Canadian writer.

Using Mimeograph and Printing Press—Madera County, Calif., illustrates county department use of a variety of materials. A collection includes folders and booklets, placards, annual report, and press releases. The most extensive item is a mimeographed book, "Principles of Good Public Health Practice." The 97 letter size pages is a scrapbook of "good health" ideas and information for use by teachers in the schools of the county.

All come from Madera County Health Unit, Madera, Calif.

Silhouette Poster Contest — For several years a silhouetted nurse has been wandering in and out of the pages of *Public Health Nursing*. She has been so "effective" that another silhouette is desired. Says the editor:

> Such a poster might represent a nurse, a nurse and her car, or a nurse giving some type of public health nursing service. These are merely suggestions. We leave the rest to your ingenuity.
>
> Three judges will pass upon all entries, and the announcement of the winners will be made in the June magazine. Send in your entry early. The contest closes April 1, 1937.
>
> All drawings must be done with India ink on hard-finished paper. And please sign your drawing in tiny letters—like the artist you are! Also, we are asking that you submit

your sketch on a sheet of hard-finished paper 10" by 12 5/7", placing the silhouette so that there will be ample space for a message, preferably at the bottom of the poster. If these requirements are not perfectly clear, or you have any questions to ask, please write to us.

The posters of runners-up will be used for decoration of the magazine. Entries will only be returned upon request and accompanying postage.

The contest is open to anyone.

Write to 50 W. 50th St., New York, N. Y.

Libraries and Social Hygiene—The "Fourth Annual Library Number" of *Journal of Social Hygiene* (June, 1936) illustrates a consistent development of public and professional libraries for the furtherance of a health program. The articles deal with a state library; a social hygiene society library; experience in a large city library; a rural library; a rural church; a university library; a school of nursing library; medical libraries; book reviews, and book lists, and other source material. Address: 50 W. 50th St., New York, N. Y. *35 cents.*

Hygeia for February, 1937 — Topics and titles, material to use and material to know, as follows:

Live with heart disease—and like it . . Cosmetic care of the skin . . Gallstones . . Stop highway carnage . . How medical discoveries are made . . Are you a nervous dyspeptic? . . Give the deaf child a chance . . Prunes . . Curious stories about health . . Dieting daughters (mistaken ideas) . . The eyes have it (what they reveal) . . The relation of parent and child . . Richard Bright (physician and investigator) . . The dietary advice of Magende (1783–1855) . . Life and death in George Washington's time . . The doctor in France . . Ultraviolet: the invisible light necessary to health . . Diabetes, doctors and dogs . . New books on health.

In "School and Health":

Guiding adolescent interests . . A teacher of physical education looks at mental hygiene (Kenosha, Wis.) . . Diet selection on a small budget (Camden, N. J., project) . . Rats teaching nutrition (Fort Wayne, Ind.) . . Physical training in first aid.

A Technical Process Briefly Outlined—"Offset lithography" or "planography" is the process much used for the reproduction of typewritten and other copy. It is sold under a variety of names.

Here are the steps in the process as stated concisely by *Business Week*, 330 W. 42d St., New York, N. Y. (Jan. 9, 1937):

The steps in offset lithography are roughly these: (1) Typewrite verbal copy, preferably on a machine with variable spacing to "justify" the right hand edge, or compose verbal copy in type by usual letter press methods. (2) Compose layout, using typewritten copy or a reproduction proof of copy set in type, plus illustrations, plus any hand lettering or photo-composed lettering. (3) Photograph copy, reducing or enlarging it as may be required, and develop resultant negative. If illustrations are already screened in copy, further screening is unnecessary, as witness the highly economical giant ads or blown-up posters shot direct from 4-color magazine advertisements (if reproduction is to appear in more than one color, a separate plate must be made for each color). (4) Print the resultant negative on sheets of zinc or aluminum previously sensitized like photographic paper. (5) Develop plate by any one of several methods leaving dark spots which take ink and light spots of uncovered metal which, when dampened like the stone, repel ink, (6) Wrap metal plate around press cylinder; make-ready normally takes much less time than for letter press. (7) Start press and feed paper.

As the plate revolves with the cylinder it is moistened slightly with acidulated water, then inked. Tightly, but not too tightly, pressed against the plate cylinder is a cylinder carrying the so-called rubber blanket which receives the impression of the plate matter and transfers or offsets it to the paper, hence the name "offset lithography." (Planography is a better word, since printing and non-printing surfaces are virtually on the same plane, but it is used only by strict purists.)

The whole process sounds cumbersome, but in actual practice the time from copy to metal plate is almost uniformly shorter than in any but the simplest letter press work without

illustrations; and the flexible rubber blanket brings a double reward in that it provides quicker make-ready by equalizing irregularities in the plate and it permits the printing of finely screened work on uncoated paper. Some of the most finely screened work (400 to the inch) is available only in lithographic processes like Aquatone and Lenzart.

DATES AHEAD

Now is the time to plan for summer educational activities.

It is not too late to follow up Social Hygiene Day, February 3, 1937. In fact even if there was no specific local recognition of the day it is likely that your community was touched by some of the broadcasting, and the newspaper publication of the material. Thus you may find the way at least partly open for some of the follow-up steps, suggested by the American Social Hygiene Association, and supplied by request to 50 W. 50th St., New York, N. Y.

The first visiting nurse started her rounds to the sick poor in March, 1877. (*See News Almanac for Social Work*). How much longer did your community wait for such services?

March 20, 1937. The first day of spring! What *is* "spring fever," and why? (Also see the *Almanac.*)

April 1. April Fool's Day. Who are April fooled, according to health agencies?

In April, the Early Diagnosis Campaign of tuberculosis associations.

April 4–11, 1937. National Negro Health Week. Address in care of U. S. Public Health Service, Washington, D. C.

April 9, 1912. The U. S. Children's Bureau was created by act of Congress. Has it meant anything to the children of your city?

April 12, 1786. First dispensary in the United States opened in Philadelphia. (See the *Almanac.*)

An aim in March of the Junior Red Cross is to "check gains made in health in the school and set necessary goals for spring." The annual junior calendar suggests how to go about this, and should be consulted by the health agency desirous of coöperating. National headquarters: Washington, D. C.

The big event of 1937 in the National Organization for Public Health Nursing is the celebration of its Silver Jubilee Anniversary. Other health groups will wish to pay tribute to the N.O.P.H.N. through the local program. Address: 50 W. 50th St., New York, N. Y.

March 21 to 27, 1937, will be Enlistment Week for the recently launched Women's Field Army Against Cancer. During that week enlistments at a dollar each will be sought, to be followed by widespread educational efforts. Address: American Society for Control of Cancer, 1250, 6th Ave., New York, N. Y.

All the Dates in a Book—*Almanac Notebook for 1937* supplements *News Almanac for Social Work*. The 1937 issue adds some dates, gives new dates for events which change with the year, and suggests how some 1936 dates were used locally here and there. They are to help to get timeliness into newspaper copy and radio talks.

Some of the listed dates are concerned with health, but health agencies may wish to collaborate in the celebration of certain dates of primary interest to other groups. And when the *Almanac* shows a crowded schedule we may wish to delay our own activities.

The Almanac Notebook sells for *35 cents;* the 1936 *News Almanac* for *50 cents;* both for *60 cents*. Community Chests and Councils, 155 E. 44th St., New York, N. Y.

FOR EDUCATION OR REFERENCE

"Changes in the Death Rate Since the 17th Century," by René Sand, M.D. *Quarterly,* Milbank Memorial Fund, 40 Wall St., New York, N. Y. Oct., 1936.

25 cents. Background; the "makings" of a lively magazine article.

"Community Nursing." Description of and report on a state-wide program of public health nursing, with emphasis on bedside care. A back cover page with 500 quarter-inch nurse silhouettes: "Count 'em!" Copies *free* from Information Service, WPA State Headquarters, Old P. O. Bldg., Albany, N. Y.

"Directory of State and Insular Health Authorities." With data as to appropriations and publications. *Public Health Reports.* Oct. 23, 1936. Supt. of Documents, Washington, D. C. *5 cents.*

"Heart Disease as a Public Health Problem: Public Education for Prevention," by Dr. J. J. Sampson. *Public Health Nursing,* 50 W. 50th St., New York, N. Y. Oct., 1936. *35 cents.* What to teach, and why.

"How Fatal Are Spider Bites?" The *Illinois Health Messenger,* Springfield, Ill., quotes Illinois statistics and interprets them to show how negligible is danger from insect and snake bites.

"Instruction in Hygiene in Institutions of Higher Education," by J. F. Rogers, M.D., Office of Education. Supt. of Documents, Washington, D. C. *10 cents.* In addition to the current review some good copy may be based on the introductory, "Beginnings of Health Instruction."

"Instructions For Persons Having Syphilis." 4 page folder. New York State Dept. of Health, Albany, N. Y.

"The Menace of the Tuberculosis Negro Domestic," by Dr. J. B. Naive, is a 2 page leaflet distributed by the Mississippi Tuberculosis Assn., Sanatorium, Miss. Tells how to do something about it.

"Milestones of Progress" (in health education in Boston schools), by J. P. Sullivan; "Publicity — Your Right Hand Man," by Janet Owen (on school sports); "An Experiment in Health Education" (in selected Negro schools), by M. J. Bent and E. F. Green. In *Journal of Health and Physical Education,* Ann Arbor, Mich. Oct., 1936. *35 cents.*

"The National Negro Health Week Movement," by R. C. Brown. *Health Officer,* Washington, D. C. Sept. and Oct., 1936. Detailed description of an effective health education project.

The new Division of Cancer Research, Connecticut State Dept. of Health, Hartford, has issued a new 8 page pamphlet on "Cancer: Prevention and Cure," and in addition is making wide use of "The Cancer Problem in New Haven," an impressive volume which devotes 5 pages to cancer education, popular and professional.

"Newspaper Publicity in a Tuberculin-testing Campaign," by E. Gillen. *Bulletin,* National Tuberculosis Assn., 50 W. 50th St., New York, N. Y. Jan., 1937.

"Post-Sanatorium Care of the Tuberculous," by Edward Hochhauser. Reprint. Committee for Care of Jewish Tuberculous, 71 W. 47th St., New York, N. Y. *Free.*

"Prevent Asphyxial Death," by P. J. Flagg. Reprint from *Hygeia.* Society for the Prevention of Asphyxial Death, 40 E. 61st St., New York, N. Y. 12 pages. *10 cents.* Includes a page about the Society which seeks to reduce the "50,000 lives lost from asphyxiation each year in the United States."

"Putting Our Knowledge of Tuberculosis to Work Through the Public Health Agencies," by Homer Folks, S.C.A.A., 105 E. 22d St., New York, N. Y. Reprint. *Free.*

"Timely Tips on Scout Protection," by F. C. Mills, is a series in *Scouting,* Boy Scouts of America, 2 Park Ave., New York, N. Y. Good material from month to month for various uses. In Dec., 1936, issue: drinking water on winter hikes, and how to dress for win-

ter weather, the latter having application in numerous directions since most people don't understand the principles of keeping warm. *10 cents.*

"Why Do We Have Medical Ethics?" by Dr. F. S. Winslow, president, Medical Society of State of New York. Reprint of radio talk. Includes plea for patient ethics, with this as basic: "Tell your doctor everything" to enable patient to get all that he needs. *Free* from the Society, 2 E. 102d St., New York, N. Y.

HEALTH EDUCATION

Both school and adult health education are represented in the references below which are listed in *Library Index*, National Health Library, 50 W. 50th St., New York, N. Y.:

Gale, G. W., M.B.: The rural hospital as an agent in native health education. *South African Medical Journal* (Cape Town) 10: 541–43, August 8, 1936).

4-H clubs raise health. *Medical Economics* (Rutherford, N. J.) 14:104, 106, 108, November, 1936.

Bauer, W. W., M.D.: Opportunities and obligations in health education. *Journal of Health and Physical Education* (Ann Arbor, Mich.) 7:610–12, 640, December, 1936.

Suggest, T. E.: A "see for yourself" program in health education. *Hygeia* (Chicago) 14:1133–34, December, 1936. How high school students are taught about tuberculosis in St. Louis.

Turner, C. E., D.P.H.: Health education as a world movement. *Journal* of the American Dietetic Association (Chicago) 12:457–62, January, 1937.

Beggs, S. T., M.D., D.P.H.: The diagnosis of health. *Public Health* (London) 50:73–76, December, 1936. Need for training the public and the medical profession in public and personal health.

Welling, J. B., and Collins, L. B.: Visualizing health education through art. *Progressive Education* (New York, N. Y.) 14:47–49, January, 1937. Exhibit of health education program in Detroit.

The Central council for health education; ninth annual conference, November, 1936. *Public Health* (London) 50:90–97, December, 1936. Report of the conference with digest of papers.

Strang, Ruth: Health education as guidance. *Journal of Health and Physical Education* (Ann Arbor, Mich.) 8:8–9, 63, January, 1937.

Greene, E. B., and McCloy, C. H.: Bibliography of health and physical education, January 1, 1932, to December 31, 1935. *Research Quarterly*, American Physical Education Association, Ann Arbor, Mich.) 7:3–43, December, 1936.

The Advertising Idea—In "Ideas About Ideas," by Guy Gilpatric, we find this paragraph:

> The advertising idea has been defined as: A thought so expressed in advertising that it attracts the casual reader, focuses his attention, registers in his memory, and impels him to buy.

Suppose we make it read in this fashion:

> The health education idea has been defined as: A thought so expressed that it attracts the casual reader, focuses his attention, registers in his memory, and impels him to do something toward better health.

How would you state it?

"Ideas About Advertising" treats of *inspiration* as a source of ideas. It is reprinted in *Printer's Ink Monthly*, 185 Madison Ave., New York, N. Y. Dec., 1936. *25 cents.*

Anti-Diphtheria in Baltimore—The range of useful printed matter in a diphtheria campaign is illustrated by the Baltimore City Health Department.

1—Billboard poster, reading:

PARENTS!
TOXOID
PREVENTS
DIPHTHERIA

(above white on blue)
(below red on white)

TOXOID
FOR EVERY BABY
WHEN SIX MONTHS OLD

Visit your physician or a
diphtheria prevention clinic
Baltimore City Health Department

2—Cardboard poster, with these words:

PARENTS! TOXOID PREVENTS DIPHTHERIA—See your Physician or visit a Diphtheria Prevention Clinic

3—Dash signs for street cars (first week), red on white:

TOXOID
PREVENTS
DIPHTHERIA

4—Dash signs (second week) blue on white:

PREVENT
DIPHTHERIA
NOW

5—Long card for center of street car (printed on both sides):

PARENTS! TOXOID PREVENTS DIPHTHERIA—It Should Be Given at the Age of Six Months or As Soon Thereafter as Possible—See Your Physician—or Visit a Diphtheria Prevention Clinic

6—A hand bill which included 4 statements about treatment.

7—A pamphlet, "Some Facts About Diphtheria and Its Prevention," of 8 pages.

8—A slip, 2 by 3 inches, addressed "To Parents."

Each of the cards and signs ended with "Baltimore City Health Department."

Rat Riddance by Education—The chief element of weakness in rat control programs is the failure to dispose of rat harborages. The disease-bearing rats are to be found in buildings made by man. Breeding spaces are freely provided by architects and tenants.

Effective control will be

> . . . best accomplished through education, which should be practical and concrete, and should be brought to the very doorstep of the property owner or tenant of the building concerned. The various types of rat harborage must be demonstrated, and the practical methods of eliminating or correcting them must be explained and illustrated.
>
> In addition to the education of the general public as just mentioned, and through the public schools, colleges, universities, civic, and other organizations, this permanent campaign must include the dissemination of information on the subject to architects, builders, contractors, plumbers, electricians, and others of the building trades to the end that they will have a better understanding of the problems involved, know what to do and how to do it, and thus be prepared to lend effective coöperation. No satisfactory progress can be made until these agencies give the health officer their support and coöperation. We must not only teach the property owner the necessity and desirability of having ratproof buildings and equipment, and to demand them, but we must invite, urge, and assist the people who design, construct, and equip buildings to be prepared to meet such a demand.
>
> To carry out such an educational program will require careful and painstaking work, but it will be well worth the effort, for it will lay a solid foundation of understanding of the various phases of the problem, inspire public confidence, and result in more wholehearted coöperation and support.

The article, "Rat Harborage and Ratproofing," by B. E. Holsendorf, appears in *Public Health Reports*, U. S. Public Health Service, Washington, D. C. Jan. 15, 1937.

Health Education in Journal—Certain articles or paragraphs in the January, 1937, issue of the *Journal* had to do with health education.

In "Integration of the Practising Physician into a Venereal Disease Program," by Baker:

> . . . the sudden reversal of an age-old attitude of "squeamishness" (Parran) and of a "conspiracy of silence" (Moore), on the part of society as a whole, as well as of the moulders of public opinion—the lay press, the radio and the cinema—to bring out into the open these "social diseases," creates the long-wished-for opportunity for health workers of making their first organized frontal attack (page 25).

Then two paragraphs (page 27), present the problem of the broader education of health workers and physicians. The time allowed forced lack of consideration of certain "interesting phases of this question,"

. . . chief among these would come a sane and carefully thought-through educative program for the general public.

"Rodent Control in Food Establishments," by Moore, closes with this statement (page 66):

Rats and mice have shared man's food for many centuries, taking what they want and spoiling much more than they eat. The rat has killed man by the millions through transmitting disease germs, and is today the most dangerous and most destructive animal in the world. What we may work for and hope for is a rat-conscious public that will not tolerate rats.

"Mental Hygiene Programs in Schools and Colleges," by Shepard (pages 67–72).

As usual, "Books and Reports," pages 83–90, contains material none will wish to miss.

New members of Public Health Education Section are listed on page 97.

Health Education for Adults—Through the Adult Education Project, WPA and New York City Board of Education, there has been prepared "Curriculum Construction: Health Education." This is the latest among the few efforts to outline group instruction in adult health education. The introductory statement says:

We approach this field of "Health Education for Adults," in the pioneer spirit. The field is comparatively uncharted, the educational opportunities are tremendous.

We know that no city has a greater asset than that represented in the health of its people. The family, the school, and the community constitute the mental, physical, social and emotional environment of adults, adolescents and children and problems of hygienic living touch their whole life.

Life today presents many vital and perplexing problems which concern the individual, the family and society at large. An intelligent use of health knowledge in the practice of daily living helps in solving very many of these problems.

In planning a curriculum consideration was given to the following:

—the economic status of groups in different areas
—the individual and family needs of those whom we serve
—the growth of the body and the control of bodily functions
—the necessity of good food for energy and efficiency and how the body uses food
—hygienic habits in daily living that insure optimum efficiency
—recreations and hobbies that the individual and the family can enjoy
—industry and business environment and its effect on health
—prevention and control of communicable disease
—home hygiene and care of the sick
—first aid in emergencies
—mental health in daily living
—social health and its effect on happiness and efficiency

The following nine courses are outlined:

Family health and family recreation . . Everyday problems in healthful living . . Mental hygiene . . Home hygiene and care of the sick . . First aid . . Child care for mother's helpers . . Problems of child and youth . . Camp counselors' course . . Hygiene of beauty.

Course II on "Everyday Problems in Healthful Living," as a sample, is developed around the following outline:

Unit I. Introductory on balance in living.

Unit II. Individual health is presented as three problems: Your physical equipment . . Habits and how they are formed . . Mental hygiene and everyday living.

Unit III. Factors in building, presented as two problems: Food problems, and the budget . . Rest *vs.* fatigue.

Unit IV. Conservation, presented as three problems: Keeping well . . Our eyes and light . . Safety in the home.

Unit V. Social assets and healthful living, presented as three problems: Posture, shoes and clothing . . Health, beauty and charm . . Leisure time activities.

Unit VI. Education for parenthood, presented as four problems: The child: coöperation in family life . . The adolescent: a hygienic life favorable to healthy development . . The adult: responsibility of the individual for the future of the race . . The community:

intelligent use of community facilities in protecting children.

Each problem is presented under the following heads:

Approach . . Content . . Discussion (a group of questions) . . Materials (such as films, pictures, pamphlets, experiments, etc.) . . Individual and class activities . . Desirable outcomes . . References (to books and pamphlets).

Immediate responsibility for the curriculum rests upon Charles Degen, technical supervisor; Nina B. Lamkin, senior project supervisor; Jane McGimsey, conference leader. The address: 143 Baxter St., New York, N. Y.

MAGAZINE ARTICLES

"Back-yard Hashish," by G. V. Haliday. *Today*, 152 W. 42d St., New York, N. Y. Jan. 23, 1937. *15 cents.* Contradictory authorities concerning marihuana.

"Changing Fashions in Health," by E. Cole (Dec., 1936); "Before and After the Doctor Comes," by E. C. Blackburn (Jan., 1937); "Family Safety and the Community," by W. H. Cameron (Jan., 1937). *National Parent-Teacher Magazine*, 1201–16th St. N.W., Washington, D. C. *15 cents* an issue.

"Debunking Legends of Childbirth: Dr. Guttmacher Attacks Superstitions With Reassuring Facts." *Literary Digest*, 354 4th Ave., New York, N. Y. Jan. 23, 1937. *10 cents.* "Few medical subjects have acquired a more tenacious folklore than this; none is more encrusted with the twin barnacles of fishwifery." Based on "Into This Universe: The Story of Human Birth," by Guttmacher.

"Exercise Tailored to Fit Type: It Should Suit Structural Frame, Internal Organs and Mind." *Literary Digest*. Jan. 23, 1937. Based on books by Crampton.

"Health at a Saving," by C. P. Streeter. *Farmer's Wife*, St. Paul, Minn. Feb., 1937. *5 cents if ordered soon.* Rural immunization projects.

"Hungry Children," by M. Davis. *Atlantic Monthly*, 8 Arlington St., Boston, Mass. Jan., 1937. *40 cents.* Review of numerous studies and testimonies. "It is apparent that vast numbers of American children are going hungry." "Without going into such complex and complicated subjects as . . . there is one easy remedy. That is more milk and food in schools. There is no reason why a quart of milk or bowl of vegetable soup should be less a part of our educational equipment than gymnasiums or libraries."

"Keep Your Hair On!" by O. L. Levin, M.D. *Book Digest*, 2 Park Ave., New York, N. Y. Feb., 1937. *25 cents.* Hair problems and their solution, with emphasis on services of dermatologist; rules for care of hair. Article condensed from the book.

"Make the Most of Winter," by Victor G. Heiser, M.D. *Collier's*. Jan. 16, 1937. "Cold weather peps you up. Winter offers a thousand chances for sport. But don't overdo. Dr. Heiser tells you what you owe yourself in health and enjoyment when the bitter winds are blowing and the thermometer hits zero."

"Next Moves in Medical Care," by M. M. Davis. *Survey Graphic*, 112 E. 19th St., New York, N. Y. Feb., 1937. *30 cents.* "We have witnessed a march of opinion and of action."

"Not Altogether Neglected," by P. O. Komora. *Commonweal*, 386 4th Ave., New York, N. Y. Dec. 18, 1936. *10 cents.* An answer to the misinformed writer of an article on the insane, and institutions for their care and treatment.

"Now You Don't See It, Now You Do," by H. E. Kleinschmidt. *Journal of Home Economics*, Mills Bldg., Washington, D. C. Dec., 1936. *30 cents.*

A new introduction to tuberculosis facts.

"The Spray Residue Hoax," by T. J. Talbert. *Kiwanis Magazine,* 520 N. Michigan Ave., Chicago, Ill. *Oct.,* 1936. *20 cents.* A university professor of horticulture makes quite a case against a current food scare.

"Surgery Applied to Medical Costs: Insurance Proposed to Remedy Nation's Illness Budget." *Literary Digest,* 354 4th Ave., New York, N. Y. Jan. 30, 1937. *10 cents.* A 3-page attempt to summarize the various attitudes for and against; conditions of patients and of doctors; experiments and proposals.

Health insurance arguments are complicated by the fact that disputants often use the terms, "State medicine," "socialized medicine," and "health insurance" interchangeably. State medicine is the particular straw man which physicians rip to shreds. Soviet Russia is the only nation in the world to espouse State medicine. In Russia medical service is free to all citizens, is paid for by public funds, and administered by public servants. Socialized medicine describes health insurance only to the extent that private practitioners may be paid from general tax funds. The bulk of the money for health insurance comes from the contributions of the insured.

The *Survey Graphic* (*Reader's Digest*) article by Dr. Parran marches on. It has been abbreviated for *Health,* 105 Bond St., Toronto, Ontario. *Dec.,* 1936. *15 cents.* Accompanied by Canadian data.

"Vitamin A for Safer Night Driving: Cod-liver Oil Seen as Deterrent for Erring Motorists." *Literary Digest,* New York, N. Y. Feb. 6, 1937. *10 cents.* How vitamin A deficiency may affect night driving; much about A, B, C, D, and G.

MOTION PICTURES

"Public Health Nursing Interpreted Through Motion Pictures," by E. W. Mumford. *Public Health Nursing,* 50 W. 50 St., New York, N. Y. Nov., 1936. *35 cents.* Review of high lights in articles on movies in August and October issues of *Public Health Nursing.*

California Tuberculosis Assn., 45–2d St., San Francisco, issues a mimeographed list of 10 16mm. films, and 3 35mm. pictures.

Safety Education, 1 Park Ave., New York, N. Y., in the Jan., 1937, issue tells how last fall—

. . . elementary school boys and girls in Tulsa, Okla., were able to see themselves and their friends in a motion picture. This picture is composed of a series of street scenes in which local children from 6 to 10 years illustrate the common street hazards and the precautions to be taken to avoid them. It will have no sound effects but will be shown to the accompaniment of an informal lecture.

The picture demonstrates the elementary safety rules and shows children the dangers of crossing the street in the middle of the block and playing in the street, as well as the proper way to skate, cycle and conduct other youthful activities. It also makes clear the meanings of the traffic signals which are in use at all schools.

The photography was supervised by A. F. Van de Marrs, reserve captain of police. Captain Van de Marrs and a squad of 8 men spent several weeks last spring selecting casts, rehearsing and making the scenes. A camera designed for amateurs was used so that the expense involved was negligible. The picture, which runs about 20 minutes, is expected to make a lasting impression on the boys and girls and to promote better pedestrian habits.

A four reel picture, "Ethyl Alcohol: Its Nature and Its Properties," is available, free of cost except for shipping charges, through the Motion Picture Bureau, Y.M.C.A., 347 Madison Ave., New York, N. Y., or 19 S. LaSalle St., Chicago, Ill., or Screen Adettes, Golden Gate Theater Bldg., San Francisco, Calif. For purchase, address National W.C.T.U., Evanston, Ill.

It is educational in character, satisfying tests of the scientific and educational world after careful review by authorities in both fields. It does, however, present the theme in popular fashion, replete with novelty in scene and action, mystery, daring, adventure

and delightful comedy. For those who have a flair for that science, undoubtedly the scenes which were shot in the laboratory of Northwestern University Medical School in Chicago will have more than casual interest. . . . the film carries on, showing the modern commercial uses of alcohol, with a gay "parade" of almost countless familiar commodities in whose manufacture alcohol plays an important role. With equal fidelity, the picture shows the new understanding of the menace of beverage alcohol, resulting from scientific research and experiment.

. . . Among the most interested spectators of the alcohol tests made for this picture at the Northwestern University Medical School, were some of the professors themselves. Five medical students were selected for the tests, which were made to measure the effects on the cerebrospinal nervous system.

"The Motion Picture and Social Hygiene Education" — "Social hygiene is a subject which naturally lends itself to interpretation through the motion picture. This fact has made it possible for social hygiene agencies to disseminate to millions of people in all parts of the world social hygiene information which might not have reached them in any other way." So writes Jean B. Pinney in *Journal of Educational Sociology*, 26 Washington Place, New York, N. Y. Nov., 1936. *35 cents.*

Miss Pinney then reviews the movie making record of the American Social Hygiene Association, including the effective but ill-fated picture, "Damaged Lives," and the problems in producing and showing pictures satisfactorily.

The same issue of the *Journal* carries a group of articles on the educational and social aspects of the motion picture.

In "Amateur Group Film Producing With Economy," K. F. Space outlines in some detail the essential steps to be taken by a group undertaking to make a movie. It should be useful to the agency which is coöperating with a school club or a class project.

NEW

Timed to the 35th anniversary of New York City's Department of Health nursing service comes the first issue of *Our Nurses*, Bureau of Nursing, 125 Worth Street. The department issued a 2 page news release on the new house organ and its contents.

RADIO

"The Health Hunters," New York State Department weekly broadcast, has been changed to 2:15 p.m., every Tuesday. Station WGY, Schenectady.

"Making Microphone Friends." Columbia Broadcasting System, 485 Madison Ave., New York, N. Y. *Free.* A 12 page booklet of suggestions for radio speakers.

Composing your talk; writing your talk; timing your talk; the use of the voice; microphone rehearsal; at the microphone; silence; how effective speakers write their speech; delivering the speech.

"A Raw Deal from Raw Milk," by E. H. and L. C. Frank. A one-act play, based on a milk-borne epidemic, written for broadcasting or stage presentation. Presented at the A.P.H.A. meeting in New Orleans; published in *Health Officer*, U. S. Public Health Service, Washington, D. C. Dec., 1936. Copies in broadcasting form, and with suggestions for stage production supplied *free.*

That the ultimate aim of birth control is not to reduce the birth rate, but to encourage better babies by making reproduction a greater privilege for willing and contented parents, was stated by Dr. William H. Cary, of the National Committee on Maternal Health, in a broadcast over WABC and Columbia network. This broadcast of a part of the program of the annual meeting of the American Birth Control League, was said to be the first nation-wide hook-up in which a physician discussed birth control.

"You Can't Be an Amateur in Radio," by H. O. Rogers. *Junior League Magazine*, Waldorf-Astoria, New York, N. Y. Feb., 1937. *30 cents*. What is said about dialogue:

Dialogue is perhaps the most important part of a radio script. The best training for writing radio dialogue is to listen to conversation. Any kind of conversation. You might try something like this: write a brief conversation yourself. Then, give your subject to two or three people to discuss, and, if possible, take down their sentences as they speak them. The difference will surprise you. Your original sentences are apt to be long and drawn-out, well constructed but verbose. People don't talk that way. They speak in brief, crisp sentences. They don't waste words as writers often waste them. They use vivid words. They are colorful. You may *read* about the weather this way: "In all the years I've lived in Tennessee I have never seen so unpleasant a day. The air is very damp." But you are far more likely to hear about it this way: "Snakes, what a day! Frogs would drown in this weather. Soggy as a sponge!"

Dialogue must also serve as character tags, name labels, in radio scripts. If you have more than two people on the set at a time —especially if they are all women or all men —it will be easy for your listener to lose the identity of your speaker. Put name tags in almost every sentence. "Yes, Mary," "Not on your life, Tom." "Mother, must I wear this dress?" "Helen darling, you know the other one won't do."

From annual report of Minnesota Public Health Assn., St. Paul:

Time on large stations which cover Minnesota and the Northwest is procured through the State Association and divided among the State Association, the Ramsey and Hennepin County Associations. This arrangement has been requested by radio station directors because they find it confusing to deal with several organizations seeking time for the same cause. In the past the smaller stations have been taken care of by those local associations equipped to do so. All of the smaller stations outside of Ramsey, Hennepin and St. Louis counties have been taken care of through the State Office. . .

Radio transcriptions purchased from the National Tuberculosis Association and from the California Tuberculosis Association have been used in past years.

Year-round radio programs are desirable but difficult. Dramatizations, much in vogue today, call for professional talent. The expense of the best type of radio program, even when time is donated, seems prohibitive. As soon as possible, however, it is hoped that some type of program, best suited to all needs, may be carried on throughout the year. In the meantime radio must be used in the best manner possible. A step toward developing a professional group has been taken this year with the coöperation of Hamline University through its radio course. The same players have been presenting dramatizations provided by the State Association for several months under the direction of Miss Anne Simley, dramatic instructor.

Since there is an overlapping in radio audiences in adjoining states, especially in Iowa, Wisconsin, the Dakotas, Illinois and Michigan, the Association has been attempting for some years to arrange a coöperative radio program with the surrounding state associations and has exchanged materials with them. The first conference between the associations was held in Sioux City in 1932. Five states were represented. Subsequent meetings have been held, the last on August 14, 1936, in Milwaukee."

Baltimore City Health Dept. broadcasts:

What are "serum injections"? Keep measles away from children under three . . Just a "cold," or pneumonia? . .

Connecticut State Dept. of Health broadcasts:

Cancer . . Rickets in children . . Safeguarding the family . . Teeth and foods (questions and answers) . . Saving money for the state (new marriage law and syphilis curb) . . Oysters . . Your temperature of concern to the physician . . Pneumonia can be cured . . Industrial worker and personal hygiene . . The pneumonia season . . Cancer and common sense . . Forward moves in Connecticut's health . .

New York City Dept. of Health broadcasts:

Pneumonia . . Winter exercise . . Let's look at the record (for 1936) . . Headaches: a warning . .

When You Talk Over the Air—

At New Orleans, Judith C. Waller,

National Broadcasting Company, Chicago, spoke on "The Complexities of Building a Radio Program." As to program building by health agencies Miss Waller said:

It seems to me your wisest step, unless you have had a great deal of successful experience in writing and producing radio programs, would be to contact the program director in your local radio station and ask for his advice. You will, I am sure, almost always find the stations ready to be of assistance and eager to try and work out different methods of presenting informational material. If you have a budget for this purpose and it will permit the expenditure of a certain sum of money, ask the program director for ideas for a program which can be built within your limit. If you must depend on amateur talent, see that ample rehearsals are arranged. If your program calls for a series of talks, here are a few suggestions which come from one of our production men:

1. Should the occasion demand the use of an individual speaker, be sure you select someone with a well modulated voice, good diction and who can read copy in as conversational a manner as possible.

2. If two speakers are used in interview or discussion, be sure they have contrasting voices, so that one may be easily differentiated from the other.

3. It is always well to make your meaning clear by well organized material—by presenting the subject or problem, offering a solution and then finally drawing a conclusion.

4. Subordinate the unimportant to the important, but as far as possible each talk should carry a single idea—otherwise a confusion of interests is left in the minds of the listener.

5. Avoid ornate words and elaborate sentence construction. Short sentences and a simple vocabulary are always preferable. One of the chief assets in President Roosevelt's Fireside Chats, is his use of simple words which are understandable by the great majority of people. Wherever possible use synonyms for technical words.

6. Avoid statistics unless well used as illustrations.

7. Wherever possible write a talk as you speak, use of colloquialisms need not be avoided; a frequent use of dashes will indicate much-needed pauses, which makes a talk sound much more as if it is being ad libed.

8. Read your talk aloud to correct awkward sentence structure, difficult combination of words and unwieldy reiteration.

9. Vary your composition with quotations, examples, questions and answers.

10. Above all things be natural by being yourself. Insincerity and affectation are more noticeable over the radio than almost anywhere else. They are sure to spell failure for they can never be convincing.

If these few simple rules are followed wherever possible, I feel sure you will have gone a long way toward accomplishing radio programs to which the public will listen with interest. And in so doing you can make radio, in the words of David Sarnoff, "your servant, faithful and tireless in its capacity to work for you as long as you see to it that it maintains a proper balance."

As Others Hear Us—In "News On the Air," by R. S. Ames (*Saturday Evening Post*, Jan. 23, 1937) we find a word of warning to health workers who broadcast:

My experience has taught me that people hear things differently than they see them. This statement may appear obvious, if you've ever given the subject much thought, but its implications are enormous when applied to radio. The human voice possesses an incredible magic, difficult both to analyze and predict, when it is transmitted mechanically. The unpredictable quality is the torment of a radio news editor's life, because he knows that the minute his script leaves his hands it is at the mercy of circumstance. . . .

Unintentionally, a brief radio news item about the puzzling disappearance of a banker once started a run on banks in his state. Radio mention of infantile paralysis has created a sudden panic among listeners, who lost much sleep and next morning deluged civic authorities with so many questions that routine business was disrupted.

During heavy rains in Los Angeles one winter, all newspapers printed scare stories about the danger of floods near the foothills. When radio news programs gave a very cautious estimate of the flood situation, affected householders lost all reason and began to evacuate their homes hurriedly.

BOOKS AND REPORTS

Clinical Tuberculosis — *By Benjamin Goldberg. Philadelphia: Davis,* 1936. 2 Vols. 1582 pp. Price, $17.50.

Although the editor describes these two volumes as encyclopedic in scope, they are not always encyclopedic on the subject of treatment.

Drolet's chapter on " Epidemiology " containing statstics concerning the morbidity and mortality of tuberculosis in native and foreign states and cities and discussions of the determining factors in mortality and morbidity is noteworthy.

The newer biology of the tubercle bacillus by Mellon that includes discussions of its variability, filtrability, and life cycle suggests questions necessitating correlation of additional laboratory and clinical knowledge regarding diagnosis and prognosis. Löwenstein's high incidence of positive tuberculous blood cultures, particularly in arthritis, has not been confirmed by others. The following chapter contains a good short description of immunity in tuberculosis by the same author and his collaborator, T. Robert Koch. These two authors' treatment of the laboratory diagnosis is brief and contains an inadequate treatment of hematology and related laboratory aids in diagnosis and prognosis.

The section on pathology by Richard H. Jaffe contains a good description of the gross and microscopic pathology with beautiful illustrations. This author's discussion of the pathology of tuberculosis from analogy with syphilis, after the example of T. E. Ranke, is interesting, but unlike syphilis, the ever present possibility of superinfection renders such an approach to his subject more or less treacherous.

One of the most interesting and profitable chapters, that of Pol N. Coryllos on the " Pathologic Physiology of the Tuberculous Lung," is prefaced by an adequate factual description of the mechanics of respiration and normal pulmonary physiology. The author then points out the analogous mechanism of gas interchange in pleura, pulmonary cavity, bronchopleural fistula, and atelectatic lung. His theory of closure of a cavity in a pneumothorax as well as in phrenic paralysis by bronchial occlusion suggests the need for further study of bronchial cauterization in humans as a therapeutic measure in some cavities.

" Physical Diagnosis," by Ornstein and Ulmar, is a didactic presentation of the altered method of procedure in the physical diagnosis of pulmonary diseases that fails to consider the important historical background of this subject. They offer an interesting theory of origin of the bronchial component of breath sounds as similar to that of sound productions in the labial organ pipe. Their suggestion of a qualitative classification of clinical tuberculosis to supplement the accepted quantitative classification points out the need for making such a combined classification practicable. A better discussion of this subject is to be found in the section on roentgenology by Potter wherein arguments in favor of the needed coöperation between clinician and roentgenologist are ably presented in an excellent style.

In the section on " Differential Diagnosis," Benjamin Goldberg would have done well to have pointed out the numerous pitfalls and blind passages prevalent in the differential diagnosis

of the protean disease in addition to his cursory descriptions of those disease entities that more clearly simulate tuberculosis of the lung.

Short chapters on prognosis, prophylaxis, home treatment of tuberculosis, non-surgical methods, diet and medicinal and symptomatic therapy are included.

"Artificial Pneumothorax," by Ralph C. Matson, offers an excellent short treatment of this subject. "Intrapleural Pneumolysis," by the same author, includes a discussion of his own operative cases as well as a description of his own adaptation of the Unverricht thorascope. "Oleothorax," by Ray W. Matson, lacks only a more complete discussion of results from being an excellent presentation of the subject.

"Phrenic Neurectomy" by the Matsons, "Surgical Selective Apical Collapse" by Coryllos, "Intrapleural Thoracoplasty" by Hedblom, "Heliotherapy" by Mayer, "Tuberculin" by Pinner, "Clinatotherapy" by Forster, "Tuberculosis of Childhood" by Blatt and Greengard, "Tuberculous Meningitis" by Levinson, "Hematogenous and Miliary Tuberculosis" and "Spontaneous and Idiopathic Pneumothorax" by Ornstein and Ulmar, "Pleural Tuberculosis" by Miller, "Tuberculous Enterocolitis" by Goldberg, "Anorectal Tuberculosis" by Martin, "Tuberculosis of the Peritoneum" by Buchbinder, "Tuberculosis of the Urogenital Tract" by McKenna, "Tuberculosis of the Ear, Nose and Sinuses" by Lederer, "Bronchoscopy in Tuberculosis" by Clerf, "Ophthalmic Tuberculosis" by Goldberg, "Tuberculosis and Pregnancy" and "Tuberculosis of the Female Genitalia and Breasts" by Terton, "Tuberculosis and the Thyroid Gland" "Tuberculosis of the Cardiovascular System" by Strauss, "Trauma and Tuberculosis" by Levy, "Tuberculosis of the Skin" by Stilliam, "Tuberculosis of the Bones and Joints" by Levison are all interestingly, if briefly considered.

The concluding chapter, "Psychopathology of Pulmonary Tuberculosis" by Neymann, does not include a wholly satisfactory consideration of mental and sex hygiene.

The two volumes which comprise this work contain over 1,500 pages. They are well printed. The illustrations are well reproduced, particularly those relating to the roentgenograms. The type is good and the general appearance of the work very pleasing.

The book presents an excellent panorama of the field of tuberculosis, a good reference book for anyone interested in the subject. Though some of the articles might be fuller, on the whole, the book is very satisfactory. A new edition will, no doubt, correct many of these minor deficiencies.

LAWRASON BROWN

Greek Medicine—*By Fred B. Lund, M.D. New York: Hoeber,* 1936. 161 pp. Price, $2.00.

We welcome another volume of this valuable series of handbooks under the general title, "Clio Medica," edited by E. B. Krumbhaar, M.D. In view of what modern medicine owes to Greek medicine, this volume is of more than usual interest, and we may add that it is unusually well done. The author acknowledges his debt to certain well known translations, but most of them have been done by himself. It is rare to find a medical man who can do such work, and we congratulate him.

The arrangement of the contents is logical. The writing is clear, interestingly done, correct as to fact, and we believe also as to interpretation and comments. We owe so much to Greek medicine that this volume can be recommended for general reading even more urgently than the very excellent ones which have preceded it.

The editor calls attention to the increasing interest which has recently been noted in the study of the history of medicine, as evidenced by the formation of new societies, journals, and institutions for the study of the subject. In this country we owe much of this to the late Sir William Osler to whom we have frequently paid tribute, and do so again gladly.

The printing and make-up of the book are excellent. Those who have seen other volumes of the series know the convenience of the size and the conciseness of the content.

MAZŸCK P. RAVENEL

Wunder des Lebens. *Unter Mitarbeit Von Dr. Herbert Michael—Dr. Gerhard A. Brecher und Hatto Weiss. Herausgegeben Von Dr. Med. B. Gebhard. Union Deutsche Verlagsgesellschaft. Stuttgart, Berlin, Leipzig.* 440 pp. 128 ill. Price, RM 24 ($9.60).

Man himself, the greatest of life's miracles, is the subject of this impressive volume, compiled with characteristic German thoroughness by Dr. Gebhard and several able associates. It is offered as a "Hand- and household book of living knowledge concerning the fundamentals of individual, family, and national life." Its main headings include: the origin of life, the life of man, the science of heredity and race, the family as the carrier of life, the family as the nucleus of national life, life in days of health and sickness. The purpose of the book is to interest the general reader in the biology of life and to give him a workable understanding of his own body.

At least one-fourth of the volume deals with heredity and race. Many pages are devoted to speculations as to how man originated and to detailed descriptions of racial characteristics of people of all the world. This leads easily to discussion of Germany's present policies with regard to race. Distinction is made between purity of race (if there is such) and homogeneity of a people (Volk). The German people, it is explained, are a biologically harmonious group with common objectives and a distinct culture. To preserve these heritages for itself and for posterity is the solemn obligation of the individuals who make up the nation. However the objective scientist may criticise the equivocation of this part of the book, the reviewer considers it, as a whole temperate and reasonable, even though he disagrees with some of the conclusions and would not recommend it as a text for other than German students. Certainly it is in sharp and agreeable contrast with other gross rationalizations emanating from the pens of "race purity" zealots.

Disquieting indeed has been the rapidly falling birth rate in Germany which began even before the World War. That is ample reason for emphasis on reproduction and parenthood. These chapters are illuminating and on a high plane. That the bearing of more and better babies is advocated in order to supply cannon fodder is categorically denied.

The book is profusely and expensively illustrated. Gebhard was in an extremely fortunate position to select illustrative matter, for he served for many years as Scientific Director of the famous German Hygiene Museum in Dresden and directed "Das Wunder Des Lebens," an exposition held in Berlin in 1935. Many of the exhibits displayed there are reproduced in picture form. Since the exhibits are of a variety of technic, the illustrations too give the impression of having been drawn from numerous unrelated sources. They are of different styles of craftsmanship and hence confusing. For example, realistic anatomical photographs alternate with schematic dia-

grams or sketches, the connection of which must surely be lost on unpractised eyes. The attempt to enliven statistical data is commendable, but again the pictorial expressions are as totally different as so many languages. This lack of integrity is disturbing and gives the work a "choppy" character.

The format of the book is beyond reproach unless one wishes to object to its size and weight which put it in the encyclopedia class. The volume is 9 x 12 inches, 2 inches thick, bound in stiff cloth-covered board and printed in clear latin type on substantial, heavy paper. The cuts are faultless.

We in the United States naturally ask how the book is intended to be used. The publisher recommends it as a book for "everybody" but the price, 24 marks ($9.60) is more than many a workman earns in a week. (This price is discounted 25 per cent in countries outside of Germany.) One wonders too how many readers would be capable of understanding the book. In this country certainly their number would be a minute fraction of the whole. As a reference work in libraries and schools it is admirable. American readers interested in how things are done and taught in Germany and in present-day attitudes toward citizenship and national policy will find this book a mine of information. The text is in German, but most of the story can be read in pictures without the aid of text. H. E. KLEINSCHMIDT

The Teaching of Physical Education—*By Jackson R. Sharman, Ph.D. New York: Barnes,* 1936. 237 pp. Price, $1.60.

This text starts with a much worthwhile chapter on the Principles of Physical Education, following this with 12 other chapters on such material as the School Program, Class Management, The Hygiene of Physical Education, The Learning Process, and The Measurement of the Results of Teaching.

Each chapter is followed with a group of interest stimulating questions, and a list of references bearing directly on the chapter content. For those interested in physical education this is a valuable text. CHARLES H. KEENE

Dispensary Patients and Economic Status, Greater Cleveland, 1935—*By Howard Whipple Green. Cleveland, Ohio: Cleveland Health Council,* 1936. 64 pp., 61 maps and charts. Price, $1.00.

Brought together by the Academy of Medicine, the Conference for the Study of Dispensaries in greater Cleveland undertook the study, of which this 64 page pamphlet is a report, to define the zone of influence of each hospital out-patient department with a view to determining the relation of service to need. The study was carried on with the assistance of Works Progress Administration.

Although concerning itself largely with new patients attending the 10 general out-patient departments of Cleveland hospitals in 1935, the pamphlet also includes studies of prenatal clinics, and visiting nurse service.

For the student of the situation in Cleveland it is a completely convincing exposition profusely illustrated with numerous well prepared, detailed tables, charts, and maps. For the reader with a general interest in the question of dispensary service zone of influence and the economic status, the report is equally convincing but unnecessarily detailed.

It is evident from this study that in Cleveland, patients attending out-patient departments do not travel long distances. Approximately one-quarter of all new patients in 1935 lived within 1 mile of the clinic they attended and

more than one-half travelled less than 2 miles.

The study is particularly significant to those interested in the question of possible abuse of hospital out-patient services. In Cleveland there is a very close relation between economic status and use of out-patient service. Thirty per cent of the families in the lower economic tenth of the city (based on lowest equivalent monthly rentals) was represented among the new patients in 1935, while less than 2 per cent of the families in the highest economic tenth had new dispensary patients that year. A similar situation is to be found in both prenatal clinics and visiting nurse service. It seems evident that Cleveland did not suffer from any general abuse of general out-patient, prenatal or visiting nurse service.

CARL E. BUCK

The Public Opinion Quarterly—*School of Public Affairs, Princeton University,* Jan., 1937. Vol. 1, No. 1. 176 pp. Price, $1.00.

That phase of health education which deals with the adult population is often indistinguishable from publicity. Even allowing for a wide difference as indicated by an exact definition of terms, there is still considerable confusion in the field of endeavor concerned with passing on ideas to the masses. The appearance of a periodical devoted to examining and analyzing public opinion is a step in establishing that endeavor on a more orderly basis.

The quarterly's first article is fittingly entitled "Toward a Science of Public Opinion." It is true that *Public Opinion* appears on the heels of a political campaign, the result of which was notable for upsetting traditional notions of the power of the press and of the printed word as molders of public opinion; and this doubtless accounts for the preponderance of material dealing with the subject as related to political affairs. But, it is hoped, it does not portend that the publication will confine itself chiefly to this segment of public opinion.

Unfortunately the magazine violates a fundamental tenet of the art which it represents. It is difficult to read. The style is frequently didactic. The text type face, set in 14 and 15 word lines, is unforgivably minute. A ruthless editing of copy so as to present the material in fewer words printed in larger type—making a book of approximately the same size—would improve it immeasurably.

Those who have undertaken this publishing venture are to be congratulated. Such a publication will help in giving direction to and crystallizing our knowledge of a subject which is of such tremendous importance in a democracy. The advancement of this science will provide a sharper tool for health education. HOMER N. CALVER

A Health Education Workbook—*By Kathleen Wilkinson Wootten. New York: Barnes,* 1936. 273 pp. Price, $1.50.

This workbook, designed for teachers, parents, nurses, and social workers, is dedicated to the ten thousand Georgia girls who have participated in the health procedures at the Georgia State College for Women from 1917 to 1936.

It is prefaced by a good "Selected Bibliography" and a list for "Free and Inexpensive Sources of Health Materials." This latter is of peculiarly great value to the teacher, who is often at her wits' end to secure material for her classes, hampered as she often is by inadequate funds for material. Its make-up is that of presenting, for each chapter, objectives, study outline, activities, and references. The 32 chapters cover a broad field, starting with the Health Ed-

ucation Program, reaching through such diversified topics as Healthful School Living, Special Schools and Classes for Handicapped Children, The Physical Education Program, Health Service, Control of Communicable Disease, The Teacher's Responsibility for the Health of the School Child, Methods in Health Education, Health Education in various grades from primary through secondary, Building a Tentative Course of Study in Health, and Evaluation of School Health Education, and concluding with a chapter on Health Education.

This is an excellent practical text of great value to teachers, school officials, and health workers.

CHARLES H. KEENE

Handbook on Social Work Engineering—An Outline — *By June Purcell Guild and Arthur Alden Guild. Richmond, Va.: Whittet & Shepperson,* 1936. 135 pp. Price, $1.50.

Increasing interest in the development of methods for evaluation of community needs and appraisal of services has been coupled with efforts to increase public understanding and support of tested procedures. This timely handbook is well written and is based on the mature experience of the authors who are well known in the social work field. It deals with the information to be secured as a basis for social planning, the organization and conduct of studies, the analysis and interpretation of data, and suggestions for social planning and money raising. It is a helpful guide for staff and board members as well as students.

IRA V. HISCOCK

A Practical Medical Dictionary—*By Thomas Lathrop Stedman, M.D. 13th ed. Baltimore: Wood,* 1936. 1291 pp. Price, with thumb index, $7.50; without index, $7.00.

One undertakes the review of this book with diffidence. It would indeed be a bold man, or else one who had devoted his entire life to lexicography, and especially medical lexicography, who would face this task with confidence. The name of the author is sufficient guarantee of its excellence, and the fact that it is now in its 13th edition shows how acceptable it has been to the educated public.

This edition celebrates the 25th anniversary of the work. While the revision was under way, the 11th edition of the *U. S. Pharmacopoeia* and the 6th of the *National Formulary* were published. The numerous changes in these standard works were adopted. The Preface tells us that this dictionary has always accepted the spelling of the *Pharmacopoeia*—though not always its Latin—so it has now adopted the spelling of sulfur and its compounds given by chemists, using " f " instead of the old " ph."

The author finds that there is still a great need for a few words on the derivation and spelling of medical terms, giving a " horrible example " to prove this case. He tells us that this need exists for professional journals as well as for the ordinary run of medical writers. With only a modicum of the knowledge and experience of the author, the reviewer can confirm his opinion. However, if we could only persuade writers to buy some such book as the one before us, and use it, much would be accomplished. Use is more important than purchase. In the liturgy of a certain church we find the advice to " read, mark, learn, and inwardly digest "—advice equally applicable to medical terminology as to religion.

Special features of this new edition are a chapter on Medical Etymology, and an appendix which gives the British anatomical terminology, and an Index of Tables, which facilitates reference.

There are other appendices giving

Tables of Drugs, Their Doses and Uses; Weights and Measures; Symbols; Stethoscopic Abbreviations; Comparative Temperature Scales; Comparative Metric and English Barometer Scales; The Chemical Elements, and Pathogenic Microparasites.

The selection of words for a medical dictionary is to a certain extent one of judgment. No medical dictionary does away with the necessity of a good English dictionary. This point is emphasized by a recent letter,* which gives a list of nearly 150 words found in Garrison's *History of Medicine*. Of these Stedman gives such words as "procatarctic" and "hodegetics," and even a reference by which one may find what "metaxenia" means. We have looked for many unusual and new words, and in general find the book well up to date. It fails, however, to give "autarceologic," a word invented some 2 years ago and now considerably used in connection with poliomyelitis.

The book is excellently printed in clear type on paper of the best quality. The illustrations are abundant and good. In every way this new edition will sustain a well established reputation, and we can give no better advice to medical writers and readers than to buy and use it. The work of medical editors everywhere would be lightened and their lives made happier if this advice were generally followed.

MAZYCK P. RAVENEL

Handbook of Health Education—A Guide for Teachers in Rural Schools—*By Ruth E. Grout. Garden City, N. Y.: Doubleday, Doran,* 1936. 298 pp. Price, $1.80.

This text is a clear, concise description of the methods and materials developed by teachers in the schools of a rural section in New York in connection with the Cattaraugus County School Health Project financed by the Milbank Memorial Fund.

While Part I is devoted to organization of the health program and its application to the situation, and discusses aims and the taking of the school health inventory, the book is made up largely of projects and experiments actually carried on in the schools.

Part II deals largely with the health of the individual; while Part III does well the thing so little attempted in health teaching—it ties up the instruction with farm and community. A bibliography concludes the material.

This is an excellent text, which, although based on rural experience, has much in it worthy of use or adaptation to the city school.

CHARLES H. KEENE

* *J.A.M.A.*, October 3, 1936, p. 1151.

BOOKS RECEIVED

READING, WRITING AND SPEECH PROBLEMS IN CHILDREN. By Samuel Torrey Orton. New York: Norton, 1937. 215 pp. Price, $2.00.

CHEMISTRY OF FOOD AND NUTRITION. By Henry C. Sherman. 5th ed. New York: Macmillan, 1937. 640 pp. Price, $3.00.

FOOD, NUTRITION AND HEALTH. By E. V. McCollum and J. Ernestine Becker. 4th ed. Baltimore: Authors, 1936. 154 pp. Price, $1.50.

HYGIENE OF THE GOSPEL OF HEALTH. By Neville M. Goodman. 3d ed. London: St. John's Gate, 1935. 195 pp. Price, $1.00.

CHILDLESS. A STUDY OF STERILITY, ITS CAUSES AND TREATMENT. By Sam Gordon Berkow. New York: Lee Furman, 1937. 307 pp. Price, $3.00.

SICKNESS AND INSURANCE. A STUDY OF THE SICKNESS PROBLEM AND HEALTH INSURANCE. By Harry Alvin Millis. Chicago: University of Chicago Press, 1937. 166 pp. Price, $2.00.

SAFETY THROUGH THE YEAR. An Activity—

Text—Workbook for Intermediate Grades. By Florence Nelson and H. Louise Cottrell. New York: McGraw-Hill, 1936. 96 pp. Price, $.52.

NUTRITION—WHAT HAS IT TO DO WITH ME? By Marie Harrington. New York: Womans Press, 1936. 45 pp. Price, $.50.

HOW TO PREVENT DISEASES BY IMMUNIZATION. Prepared by the National Drug Company, Philadelphia, Pa. For distribution by the physician to his patients. 8 pp. Free to physicians upon request.

PERSONALITY: ITS STUDY AND HYGIENE. By Winifred V. Richmond. New York: Farrar & Rinehart, 1937. 279 pp. Price, $2.50.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Bigger and Better Youngsters—Though freshmen enter college at a younger age, they are bigger than they used to be. The probable causes are thought to be better nutrition in childhood, less communicable diseases, and a better standard of health intelligence.

CHENOWETH, L. B. Increase in Height and Weight and Decrease in Age of College Freshmen. J.A.M.A. 108, 5:354 (Jan. 30), 1937.

Concerning Miasms—Air as a factor in the spread of disease is not as important as the early research scientists thought. The study that is still needed to determine how much of a factor it really it, is hinted at in this excellent paper.

CHOPE, H. D., and SMILLIE, W. G. Air-Borne Infection. J. Indust. Hyg. & Toxicology. 18, 10:780 (Dec.), 1936.

Where Tuberculosis Lingers — Bird's-eye views of tuberculosis mortality in the United States, by counties, reveal the sore spots strikingly.

DAUER, C. C. Distribution of Tuberculosis Mortality in the White Population of the United States. Pub. Health Rep. 52, 3:70 (Jan. 15), 1937.

Difficulties in British Tuberculosis Services—This delightful paper on the general topic of administering public services for the care of the tuberculous patient should be reprinted in some American journal so that health workers here might enjoy the dry humor of the presentation and be subjected to a few painless but wholesome digs in their mental ribs.

DAY, G. H. The General Practitioner and Tuberculosis. *J. State Med.* 45, 1:37 (Jan.), 1937.

What's True in Air Conditioning?—With so much publicity given by commercial interests to air conditioning, all health workers will do well to study this brief and dispassionate discussion of the subject, which points out limitations as well as definite values.

DRINKER, P. The Application of Air Conditioning in Normal Life. J. Indust. Hyg. & Toxicology. 18, 10:767 (Dec.), 1936.

Typhus and Related Fevers — Epidemic (louse-borne) and endemic (flea-borne) typhus and Rocky Mountain spotted fever are differentiated.

DYER, R. E. Diseases of the Typhus Group in North America. Canad. Pub. Health J. 28, 1:1 (Jan.), 1937.

Repeating Diphtheria Immunizations—Because a third of a group of immunized children were found Schick positive 5 years later, the question is under consideration of giving all children immunized in infancy, a 1 c.c. dose of toxoid upon entering the Toronto schools.

FRASER, D. T., and BRANDON, K. F. Duration of Schick Immunity. Canad. Pub. Health J., 27, 12:597 (Dec.), 1936.

Children of the Poor—Studying family size in relation to family income levels leads to the conclusion that the receipt of relief did not stimulate propagation (up to 1932). Instead, it may be assumed that one reason some families sought relief was because they had more children to support. Do you remember the hullabaloo raised about reliefers having more and more candidates for relief?

GRIFFIN, H. C., and PERROTT, G. St. J. Urban Differential Fertility During the Depression. Milbank Quart. 15, 1:75 (Jan.), 1937.

Birth **Rate Trends**—Declines in birth rates among foreign born mothers are greater than among native born, until in the poor neighborhood, the rate is as low or lower than that among the native born. Comparison of rates at different age levels discloses some interesting situations. The findings as a whole will give little comfort to the alarm-viewers.

KISER, C. V. Trends in Annual Birth Rates Among Married Women in Selected Areas According to Nativity, Age, and Social Class. Milbank Quart. 15, 1:48 (Jan.), 1937.

Killing **Trichinae**—In the conclusion of this excellent epidemiologic study of a family outbreak of trichinosis, a new phrase is added to the usual admonition about thorough cooking of pork: it is this qualification, "*i.e.*, until all natural color is gone." This seems to be a useful addition to our educational armamentarium.

OTTO, G. F., and JANNEY, J. H., JR. A Study of Trichinosis in a Maryland Family. Am. J. Hyg. 25, 1:76 (Jan.), 1937.

Eighty **Brave Men**—Pfeiffer's bacillus in virulent cultures inoculated by inhalation into 80 volunteers produced manifestations which resemble some of the symptoms of influenza; but the organism is certainly not the cause of epidemic influenza.

SMORODINTSEFF, A. A., *et al.* Clinical and Laboratory Investigations of Volunteers Infected with Pfeiffer's Bacillus. Lancet. 2, 24:1381 (Dec. 12), 1936.

International Health Appraisal—Measurement of performance in public health administration so eminently productive of good in America is proposed for other countries. Our appraisal forms have become sanitary indices with much broader social implications. This is something all should know about.

STOUMAN, K., and FALK, I. S. Health Indices. Milbank Quart. 15, 1:5 (Jan.), 1937.

Mental Hospitals to be Surveyed—Listed are the representatives of eight national organizations concerned with mental hygiene, which compose a committee, embarked upon a wide study program of the care of mental patients.

TREADWAY, W. L. An Organization for Promoting Mental Hospital Services in the United States and Canada. Pub. Health Rep. 51, 52:1783 (Dec. 25), 1936.

About Vitamins—Vitamin A deficiency disturbs the epithelial cells; B, the physiology of the nervous system; C, the mesenchymal tissue; D, suspends the cartilage cell cycle. Eight forms of vitamin D are artificially prepared. Methods of detecting vitamin deficiencies are considered. These are some of the interesting features of three technical papers.

WOLBACH, S. B. The Pathologic Changes Resulting from Vitamin Deficiency.

BILLS, C. E. New Forms and Sources of Vitamin D.

YOUMANS, J. B. The Present Status of Vitamin Deficiencies in Practice. J.A.M.A. 108, 1:7 (Jan. 2), 1937.

What Six Hundred Millions Have Done—Recapitulation of the recent progress in sewage disposal, together with a brief recital of the sore spots still remaining in city and country.

WOLMAN, A. What Progress in Stream Sanitation. Munic. San. 8, 1:40 (Jan.), 1937.

ASSOCIATION NEWS

SIXTY-SIXTH ANNUAL MEETING
AMERICAN PUBLIC HEALTH ASSOCIATION

New York, N. Y.

October 5–8, 1937

HEADQUARTERS: HOTEL PENNSYLVANIA

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

I. Hope Alexander, M.D., 620 City-County Bldg., Pittsburgh, Pa., Director, Dept. of Public Health

Goodman Bare, M.D., County Health Dept., Anderson, S. C., County Health Officer

Kurt C. Becker, M.D., 111 S. Troy St., Royal Oak, Mich., Director, Royal Oak District, Oakland County Dept. of Health

Sheldon D. Carey, M.D., Christiansburg, Va., Montgomery County Health Officer

Harriet E. de Stanley, 1029 Salem Rd., Union, N. J., Deputy Health Officer, Union County Local Health Unit

Henry M. DeWolfe, M.D., C.P.H., 15 Windemere Circle, Braintree, Mass., State District Health Officer

Stanford F. Farnsworth, M.D., 453 Fairmount Ave., Oakland, Calif., Junior Health Officer, State Dept. of Health

Allan Filek, M.D., Rm 209, 302 Pine St., Green Bay, Wis., District State Health Officer

Joseph P. Franklin, M.D., City Hall Bldg., Cumberland, Md., City, County and Deputy State Health Officer

Harry V. Gibson, Court House Annex, Eau Claire, Wis., County Health Officer

Ollie M. Goodloe, M.D., C.P.H., Maysville, Ky., Director, Mason County Health Dept.

John J. Heagerty, M.D., D.P.H., Daly Bldg., Ottawa, Ont., Canada, Chief Executive Assistant, Dept. of Pensions and National Health

J. N. Holtzclaw, M.D., 300 Perry Ave., Greenville, S. C., Assistant Health Officer, Greenville County Health Dept.

John A. Kahl, M.D., Municipal Bldg., Vancouver, Wash., Health Officer, Clark County-City Health Dept.

Max B. McQueen, M.D., Bannock County Health Unit, Pocatello, Idaho, Director

James P. O'Brien, M.D., 814 Harris Ave., Woonsocket, R. I., Director, Northern Health District, U. S. Public Health Service

Keble B. Perine, 486 Concord Ave., Belmont, Mass., Agent, Board of Health

Herbert F. Readling, M.D., Health Dept., Durham, N. C., County Physician

Roy J. Turner, M.D., Fayetteville, Ark., District Health Officer

Paul R. Withington, M.D., 350 Randolph Ave., Milton, Mass., Member, Board of Health

Robert B. Wolford, M.D., State Health Dept., Austin, Tex., Director, Communicable Disease Bureau

Laboratory Section

Alec Bradfield, 489 Main St., Burlington, Vt., Assistant Animal and Dairy Husbandman, Agricultural Experiment Station

Mrs. E. B. M. Cook, 912 W. 23 St., Austin, Tex., Bacteriologist, State Dept. of Health Laboratories

Eloise T. Haywood, Ph.D., New Haven Water Co., New Haven, Conn., Chemist

Marcia L. Himes, State Dept. of Health,

Lansing, Mich., Technical Secretary, Dept. of Health Laboratories

Robert E. Hurn, 310 W. 17, Austin, Tex., Bacteriologist, State Dept. of Health Laboratories

Courtland S. Mudge, Ph.D., Davis, Calif., Associate Professor of Bacteriology, University of California

Joseph N. Murphy, Jr., 711½ Trinity, Austin, Tex., Bacteriologist, State Dept. of Health Laboratories

Joseph C. Register, State Hygienic Laboratory, Jackson, Miss., Bacteriologist

John T. P. Riordan, Jr., William Wirt Winchester Hospital, West Haven, Conn., Laboratory and X-ray Technician

Herman Rosenstein, 2823 Kensington Ave., Philadelphia, Pa., Graduate work in bacteriology, University of Pennsylvania

Antonio Rottino, St. Vincent Hospital, 7th Ave. & 11 St., New York, N. Y., Laboratory Director

Edgar J. Staff, 345 State Office Bldg., Providence, R. I., Chief, Division of Laboratories

Mildred T. Woolley, Desert Sanatorium, Tucson, Ariz., Bacteriologist

Vital Statistics Section

Marguerite F. Hall, Ph.D., 25 Ridgeway, Ann Arbor, Mich., Instructor in Hygiene and Public Health, University of Michigan

Verna G. Kelley, Health Dept., Jackson, Mich., Statistician

Margaret E. C. Solum, State Dept. of Health, Des Moines, Ia., Assistant Director, Division of Vital Statistics

Public Health Engineering Section

William J. Downer, State Dept. of Public Health, Springfield, Ill., Assistant Sanitary Engineer

William C. Gibson, Health Dept., Allegan, Mich., Sanitary Engineer, Allegan County Health Dept.

George L. Hall, Ambassador Apts., Baltimore, Md., Acting Chief Engineer, State Dept. of Health

Theodore R. Kendall, 470 Fourth Ave., New York, N. Y., Engineering Editor, *The American City Magazine*

Franz J. Maier, 345 W. 87 St., New York, N. Y., Sanitary Engineering Assistant, U. S. Public Health Service

Frank M. Stead, 166 Hall of Justice, Los Angeles, Calif., Assistant Epidemiologist, County Health Dept.

Industrial Hygiene Section

Clark D. Bridges, 120 S. LaSalle St., Chicago, Ill., Director, Workmen's Compensation Health and Safety Bureau, Illinois Mfgrs. Assn.

Clyde H. McClure, 4132 Grove Ave., Western Springs, Ill., Chemical Engineer, Division of Industrial Hygiene, State Dept. of Public Health

Food and Nutrition Section

Samuel Abraham, 468 Riverside Drive, New York, N. Y., Chief, Division of Milk Inspection, New York City Dept. of Health

Fuller D. Baird, National Oil Products Co., Harrison, N. J., Director, Nutritional Laboratory

Garnet E. Birch, 806 U. B. Bldg., Dayton, Ohio, Director, Miami Valley Dairy Council

Irving Feuerstein, 434 Ashford St., Brooklyn, N. Y., Inspector of Foods, New York City Dept. of Health

John L. Loughlin, 909 Franklin Ave., McKeesport, Pa., Menzie Dairy Co.

Walter C. Russell, Ph.D., New Jersey Experiment Station, New Brunswick, N. J.

Ben R. Schwartz, 914 Belmont Ave., Brooklyn, N. Y., Food Inspector, New York City Dept. of Health

Nina Simmonds, Sc.D., Univ. of Calif., Medical Center, San Francisco, Calif.

William R. M. Wharton, 201 Varick St., New York, N. Y., Chief, Eastern District, Food and Drug Admr., U. S. Dept. of Agriculture

Child Hygiene Section

Vincent Accardi, M.D., Crownpoint, N. Mex., Senior Physician, U. S. Indian Service

Harry S. Andrews, M.D., Heyburn Bldg., Louisville, Ky.

H. Earl Belnap, M.D., Rm 12, Fordonia Bldg., Reno, Nev., Director, Division of Maternal and Child Health, State Board of Health

Jessie B. Bierman, M.D., State Board of Health, Helena, Mont., Director, Division of Child Hygiene

M. Bernard Brahdy, M.D., 531 E. Lincoln Ave., Mt. Vernon, N. Y., School Physician, Dept. of Health

Jane P. Brown, R.N., 2305 Columbia, Olympia, Wash., Staff Assistant, Child Welfare Division, State Dept. of Public Welfare

Margaret Phelps, 130 W. Genesee St., Syracuse, N. Y., Assistant Supervisor of Health Teaching, Public Schools

Helen C. Swift, Old Capitol Bldg., Olympia, Wash., Supervisor, Child Welfare Division, State Dept. of Public Welfare

Grace S. Wightman, M.D., Capitol Bldg., Springfield, Ill., Chief, Division of Child Hygiene and Public Health Nursing, State Dept. of Public Health

Public Health Education Section

Lloyd S. Bambauer, M.D., 705 Hume St., Bishop, Calif., Field Physician, U. S. Indian Service

J. H. Berkowitz, 1950 Andrews Ave., New York, N. Y., Special Research, Temporary Emergency Relief Admr.

Agnes Breen, Box 786, Wrangell, Alaska, School Nurse, and Health Education Teacher, Wrangell Institute

Bessie Bunzel, 180 Riverside Drive, New York, N. Y., Research Assistant, Metropolitan Life Ins. Co.

Leah R. Heslop, R.N., Oakland County Health Dept., Pontiac, Mich., Public Health Nurse (Educator)

Martin A. Hollister, 6890 Eastern Ave., Takoma Park, D. C., Associate Secretary, Medical Dept., General Conference of Seventh Day Adventists

Neven B. Kilpatrick, 810–14 St., Denver, Colo., Director of Health Education, Denver Dairy Council

Byron F. Mock, M.D., 2677 N. Main St., Santa Ana, Calif., Director of Health and Development, City Schools

Jose Miguel Pena y Hernandez, M.D., Calle Jota Esquina Nueve, Vedado, Havana, Cuba, Director of Hospital

Oscar S. Tellez, Dr.P.H., 2829 W. Wisconsin Ave., Milwaukee, Wis., Health Dept.

Dora R. Tyer, Jonesboro, Tenn., Public Health Education Coördinator, Washington County Health Dept.

Public Health Nursing Section

Catherine A. Delaney, 621 Forrest, Ann Arbor, Mich., Trainee under Social Security

Marion A. Fluent, 2573 E. 55 St., Cleveland, O., Director, University Nursing District

Henrietta Landau, R.N., State Dept. of Health, Albany, N. Y., Education Supervisor

Lorna L. Leetch, Forret, Ill.

Mrs. Arthur A. Marsters, Blue Mill Road, Morristown, N. J.

Eunice McClure, 322 John St., Ann Arbor, Mich., Student

Norma M. Pfrimmer, R.N., 428 State Office Bldg., Denver, Colo., Acting Supervisor, Division of Public Health Nursing, State Dept. of Health

Josephine P. Prescott, Roosevelt Hotel, Washington, D. C., Director, Bureau of Public Health Nursing, Dept. of Health

Mathilda Scheuer, Lenox Apts., Philadelphia, Pa., Educational Director, Visiting Nurse Society of Philadelphia

L. Ruth W. Self, R.N., Rawls Hotel, Enterprise, Ala., Senior Research Aid, Tennessee Valley Authority

Epidemiology Section

Albert C. Edwards, M.D., 609 Walton Place, Madison, Wis., Epidemiologist, State Board of Health

B. Barrett Gilman, M.D., 19 Joy St., Boston, Mass., Epidemiologist, State Dept. of Health

Allan L. McLean, M.D., C.P.H., Dalhousie University, Halifax, N. S., Canada, Professor of Epidemiology,

Sedgwick Simons, M.D., C.P.H., 701 Pavilion Ave., Columbia, S. C., Syphilology, State Board of Health

John D. Yeagley, M.D., City Hall, York, Pa., Director of Public Health

Unaffiliated

Elmer McK. Bingham, M.D., 1539 Walnut St., Berkeley, Calif., Student

Joseph I. Cheskis, Ph.D., 22 Evans Way, Boston, Mass., Bacteriology Teacher, Middlesex College

Emilie E. A. Clarke, M.D., 5551 Vancouver Ave., Detroit, Mich., Postgraduate course in Public Health and Preventive Medicine, Wayne University

Bernard D. Daitz, 1345–53 St., Brooklyn, N. Y., Student

Robert M. Daley, M.D., 393 Seventh Ave., New York, N. Y., Medical Director, Equitable Life Assurance Society

Frank R. Ellis, 1500 Taylor Ave., Detroit, Mich., Student

Leon A. Fox, M.D., Dr.P.H., Ph.D., 107 W. Monument St., Baltimore, Md., Army Medical Officer

P. Conner Hulse, D.D.S., 600 Highland Ave., Palmyra, N. J., Chairman, Council on Mouth Hygiene, New Jersey State Dental Society

Edith MacBride-Dexter, M.D., State Dept. of Health, Harrisburg, Pa., Secretary of Health

Frank A. Nelson, M.D., Fort Duchesne, Utah, Senior Physician, U. S. Indian Service

Thomas M. Reid, M.D., 104 Pioneer St., Brooklyn, N. Y., Practising Physician

Henry F. Vaughan, Jr., 370 Yale Station, New Haven, Conn., Student

NEWS FROM THE FIELD

DR. HUGH S. CUMMING HONORED

THE Marcellus Hartley Medal of the National Academy of Sciences, marking this distinguished body's appreciation "for eminent services to the public performed without a view to monetary gains and by methods which in the opinion of the academy are truly scientific," has been presented to Dr. Hugh S. Cumming, Honorary Fellow A.P.H.A., former Surgeon General of the U. S. Public Health Service.

Dr. Cumming is the 15th American scientist to receive this honor. The medal was presented at the annual autumn meeting of the Academy held at the University of Chicago, Nov. 16–18.

GEORGE W. MC COY, M.D.

GEORGE W. McCOY, M.D.,† was relieved as Director of the National Institute of Health, Washington, D. C., as of February 1, and L. R. Thompson, M.D., Assistant Surgeon General in Charge of the Scientific Research Division has been detailed as his successor. Dr. McCoy has been assigned by the Surgeon General as Medical Director of Studies on the Prevalence and Spread of Leprosy. His headquarters will be in Washington, but a great deal of his time will be spent in the Southern and Southwestern states. He was promoted to the rank of Medical Director of the National Institute of Health July 1, 1930.

He was commissioned Assistant Surgeon, U. S. Public Health Service from the State of Tennessee, June 22, 1900.

Some of his assignments were as follows:

Hygienic Laboratory, now the National Institute of Health (November, 1906, to March, 1908).

Service in connection with a plague campaign in San Francisco, Calif., 4 years (March, 1908, to November, 1911).

Director, Leprosy Investigation Station in Hawaii. During part of this time he was also Sanitary Adviser to the Governor of Hawaii and had charge of the campaign for the eradication of mosquitoes in Honolulu. He was promoted to the grade of Surgeon (March 3, 1913).

Since 1915 he has been on duty as Director of the National Institute of Health, Washington, D. C.

In 1931 he was awarded the Sedgwick Memorial Medal of the American Public Health Association "for distinguished service in public health."

Dr. McCoy has been a member of the Laboratory Section of the American Public Health Association since 1917. He was Chairman of the Laboratory Section 1917–1918.

HEALTH DEPARTMENTS MERGE

THE Americus County and Sumter County, Ga., Health Departments merged January 1. Dr. William Franklin Castellow, of Montgomery, Ala., is the new Health Officer, succeeding Dr. Abram J. Davis.

TROPICAL DISEASES LABORATORY

THE Department of Hospitals of New York City has established at Bellevue Hospital a laboratory for tropical and subtropical diseases. Dr. Douglas Symmers, General Director of Laboratories of the Department of Hospitals, will have supervision of the Laboratory.

DIABETES CLINIC MEETING

THE Committee on Diabetes Clinics of the New York Diabetes Association announces its first public meeting, to be held at Cornell University Medical College Amphitheatre, 1300 York Avenue, New York, on Friday, March 5, at 8:30 P.M.

* Fellow A.P.H.A.
† Member A.P.H.A.

TEXAS HOSPITAL FOR NEGROES

THE Thompson Sanatorium, of Kerrville, Tex., has been sold to the State of Texas, to be used as a state hospital for Negroes with tuberculosis. —*J.A.M.A.*, Jan. 23, 1937, p. 306.

WESTERN BRANCH MEETING DATES CHANGED

THE Annual Meeting of the Western Branch, A.P.H.A., will be held in Phoenix, Ariz., April 13–15. This is a change from the dates previously announced, April 7–9.

The Arizona and New Mexico Public Health Associations will meet in Phoenix on April 12.

REHABILITATING THE CRIPPLED CHILD

THE NEW YORK STATE Department of Health in coöperation with New York University has established several courses in study and practice to train properly qualified individuals for work in the field of the rehabilitation of the crippled child. These courses will be offered at the University in New York City and at the New York State Reconstruction Home at West Haverstraw, N. Y.

Beginning March 8, a 15 weeks course will be offered covering the general principles underlying the work with handicapped children. There will be discussions and demonstrations of the various types of diseases which cause these handicaps and some experience will be provided in corrective activities as they relate to physical rehabilitation of the patient. A field program of school and clinic work under supervision will afford the student experience essential for handling the problems of the handicapped child.

On July 6 the course will be offered again in conjunction with a briefer 6 weeks period for orientation purposes. Information can be secured from Dr. Walter J. Craig, Director of the Division of Orthopedics, New York State Department of Health and from New York University, New York City.

NEW BULLETIN

A NEW bulletin, *Our Nurses*, was issued for the first time by the New York City Department of Health on January 16. The new publication is primarily an organ of the Bureau of Nursing, and is to be issued 5 times each year.

MAY DAY–CHILD HEALTH DAY, 1937

HEALTH Protection For Every Child is the official slogan adopted for the observance of May Day–Child Health Day, 1927, which will be Saturday, May 1, 1937, as sponsored by the Children's Bureau, at the request of the Conference of State and Provincial Health Authorities of North America.

DEMONSTRATION HEALTH UNIT

A HEALTH unit has been established in Dane County as one of three demonstration units in Wisconsin made possible by Social Security funds. Dr. Erwin F. Hoffman, of Cameron, Wis., has been appointed Director. Tuberculin testing and goiter prevention will be special objectives of the new department, which will limit its activities to small towns and rural areas outside Madison.

"ANGLOS" IN NEW MEXICO

THE Commonwealth Fund spent nearly $2,000,000 in 1936, more than two-thirds of which was devoted to the promotion of medical education and research in cities and the improvement of medical and nursing service, especially in rural areas. The story of the latter in the State of New Mexico is of particular interest because the Americans are so definitely the minority race. The everyday American is an

"Anglo," while the Spanish-American is the "native." . . .

Yet public health service follows the best American patterns. There is a full-time health officer for every 40,000 persons and at least 1 full-time nurse in every county. But counties are large, and often a nurse has to keep her eye on a school a hundred or more miles from her office. The U. S. Public Health Service, the Children's Bureau, the Rockefeller Foundation and the Commonwealth Fund have all helped the State. . . . The State is gradually assuming responsibility for the whole system. Fortunately it has had the help of private fund and foundation in undertaking so aggressive a program of aid in the face of such vast distances, where 81 per cent of the people live outside the towns. . . .—*New York Times*, Jan. 19, 1937.

HEALTH BILLS IN CONGRESS

ATTENTION is called by George C. Ruhland, M.D.,* Health Officer of the District of Columbia, to the fact that state and municipal health officers will be interested in bills pending before Congress affecting the District of Columbia. Since the government of the District of Columbia is largely in the hands of Congressmen elected entirely outside the District, it is necessary to rely upon public opinion in the country at large to prevent undesirable bills becoming law. Dr. Ruhland also points out that undesirable legislation of the type proposed may easily be used as an argument and as precedent in various states.

Bill HR 220, a Bill Prohibiting the Making of any Form of Vaccination or Inoculation a Condition Precedent to Admission to any Public or Private School or College.

HR 3890, A Bill to Prohibit Experiments upon Living Dogs in the District of Columbia. This is the sort of bill which if enacted would interfere seriously with the progress of scientific medicine.

HR 4806 and S2153, An Act to Provide for the Prevention of Blindness in Infants in the District of Columbia. Under the provisions of this bill the practice of cultists who treat human ailments by prayer or spiritual means would be excluded from regulations applicable to legitimate practitioners of the healing art.

PERSONALS

WILSON G. SMILLIE, M.D.,* of Harvard University, Boston, has been chosen as Professor of Public Health and Preventive Medicine and head of that department in the Cornell University Medical College in New York. In his new post he will represent Cornell in supervision of the health center in Kips Bay, Yorkville, now being erected in coöperation with the Department of Health of New York City. He plans to take up the new work in the fall of 1937.

DR. EDMUND E. DAY will be inaugurated as President of Cornell University, Ithaca, N. Y., on October 8, succeeding Livingston Farrand, M.D.*

DR. DONALD G. BARTON has been appointed Health Officer of Concord, N. H., succeeding Travis P. Burroughs, M.D.,† who recently became Secretary of the New Hampshire State Board of Health. Dr. Barton has been Director of the Division of Maternal and Child Health of the State of New Hampshire since July 1, 1936.

DR. FRANK G. BOUDREAU, Chief of the League of Nations Service of Epidemiological Intelligence and Public Health Statistics, has been appointed Executive Director of the Milbank

* Fellow A.P.H.A.
† Member A.P.H.A.

Memorial Fund, of New York, effective April 1. He will succeed the late Edgar Sydenstricker.

H. E. KLEINSCHMIDT, M.D.,* of New York, is on leave of absence from the National Tuberculosis Association, beginning February 1, to serve as Director of Public Health Training of the New York City Health Department. Dr. Kleinschmidt will have a "university" of 2,500 students, the entire personnel of the Health Department, and his responsibilities will be to organize a plan of continuous training for them, leading to greater effectiveness in their positions. He aims also to familiarize all workers with the purposes of the health department and to encourage an appreciation of the public health movement in general. The new appointment is made possible by Social Security funds and the scheme of education and training is part of the far reaching plans of Dr. John L. Rice, Commissioner of Health, for the present functioning and future development of the New York City Health Department.

HARRY FIELD PARKER, M.D., of Warrensburg, Mo., has been appointed Health Commissioner of Missouri, succeeding Elmer T. McGaugh. Herman S. Gove, M.D., of Linn, Mo., has been serving as temporary Health Officer since Dr. McGaugh's resignation.

TRAVIS P. BURROUGHS, M.D.,† Health Officer of Concord, has been appointed Secretary of the New Hampshire State Board of Health, to succeed the late Charles Duncan, M.D.*

DONALD B. ARMSTRONG, M.D.,* has been reëlected President of the National Health Council, of New York.

RUTH E. BOYNTON, M.D.,† Associate Professor of Preventive Medicine and Public Health, University of Minnesota Medical School, Minneapolis, Minn., has been appointed Director of the Student Health Service of the University. Dr. Boynton succeeds Dr. Harold S. Diehl, who was appointed Dean.

WILLIAM H. TALIAFERRO, PH.D.,† Dean of the Division of Biological Sciences, University of Chicago, will be at the School of Tropical Medicine of the University of Puerto Rico, for three months, conducting research on the mechanism of immunity to trichiniasis, a joint project of the University of Chicago and the School of Tropical Medicine.

MARION F. LOEW, M.D.,† formerly Supervisor of Tuberculosis Clinics in the New York City Department of Health, has been appointed Assistant Director on the staff of the Division of Maternity, Infancy, and Child Hygiene of the New York State Department of Health.

LOWELL J. REED, PH.D.,* Professor of Bio-Statistics at Johns Hopkins University School of Hygiene and Public Health, Baltimore, has been elected dean of the School of Hygiene, effective July 1, 1937. Professor Reed will succeed Dr. Allen W. Freeman, Professor of Public Health Administration, under the system of rotation adopted some years ago at the School of Hygiene. Dr. Reed, who became identified with the School in 1918 and has been Professor of Bio-Statistics since 1925, is a graduate of the University of Maine and the University of Pennsylvania. His contributions have covered a wide variety of subjects in the fields of mathematics and statistical biology.

ARTHUR T. MCCORMACK, M.D.,* of Louisville, Secretary of the Kentucky State Board of Health, will now bear the title State Commissioner of

* Fellow A.P.H.A.
† Member A.P.H.A.

Health, in accordance with a statute passed by the 1936 legislature authorizing reorganization of the department. He has served as State Health Officer since 1912. Dr. McCormack is President-Elect of the American Public Health Association.

DEATH OF JOHN THAMES, M.D.

JOHN THAMES, M.D.,* of Charleston, W. Va., died January 11. He was 66 years of age, and had served as Director of the Kanawha County Health Unit from July, 1926, to the time of his death.

Dr. Thames took his medical degree from the Louisville Medical College, now the University of Louisville. He took postgraduate work at the University of Pennsylvania Medical School and was engaged in general practice many years before taking up public health work.

Entering the United States army service at Fort Oglethorpe, Ga., in 1917, Dr. Thames was transferred to Fort Ethan Allen, Vermont, the latter part of that year. Early in 1918 he was stationed at Washington barracks, with the rank of captain and serving as assistant post surgeon. He remained there until the end of the World War. In 1929 he was transferred to Camp Humphreys, Virginia, going from there into public health work in Little Rock, Ark., then to Kingwood, Preston County, W. Va., as County Health Officer. The office of full-time health officer was established at Kanawha County on July 22, 1926, and Dr. Thames was called to fill the position on recommendation of the U. S. Public Health Service and the West Virginia Department of Health.

Dr. Thames was particularly active in immunization work, and instituted measures for the control and eradication of communicable diseases that raised the health standards in the county to a high point. He was made a colonel in the United States Army Reserve Medical Corps in 1934.

DEATHS

SIR DAVID SEMPLE, M.D., D.Sc., Lt. Col. R.A.M.A. (Ret.), died January 7, at the age of 80 years. Colonel Semple had an eventful career, and received many honors. His best known work was in research in rabies and its treatment. He founded the Pasteur Institute at Kasauli, India, in 1900. In 1905 he became Director of the Central Research Institute at Kasauli, and in 1913 went to Egypt as Director-General of the Public Health Department of that country. He developed the well known Semple vaccine against rabies, which in this country is now more used than any other. Perhaps not quite so efficient as some other methods, it is practically foolproof.

JOHN H. GREGORY,† Sanitary Engineer and for 15 years Professor of Civil and Sanitary Engineering at Johns Hopkins University, Baltimore, Md., died January 18, at the age of 62.

CHARLES G. SONNTAG, a member of the group of men who volunteered under the leadership of Dr. Walter Reed to submit themselves to the bite of the yellow fever-bearing mosquito, died February 19. He was buried with military honors in Arlington Cemetery.

DR. EDWARD H. SALMON, for 15 years Chief of the Communicable Disease Division of the Jersey City Health Department, died February 28, ot the age of 60.

WILLIAM B. KEELER, M.D.,† Health Commissioner of Boston, Mass., since January, 1936, died February 11, at the age of 69.

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* Fellow A.P.H.A.
† Member A.P.H.A.

CONFERENCES AND DATES

American Public Health Association —66th Annual Meeting. Hotel Pennsylvania, New York, N. Y. October 5–8.

American Association for the Advancement of Science. Denver, Colo. June 21–26.

American Association of Industrial Physicians and Surgeons. Hotel Statler, Detroit, Mich. May 3–7.

American Association of School Physicians. Annual Meeting in conjunction with Annual Meeting of the American Public Health Association. Hotel Pennsylvania, New York, N. Y. October 5–8.

American Association of the History of Medicine. Atlantic City, N. J. May 3–5.

American Chemical Society. Chapel Hill, N. C. April 12–15.

American College of Surgeons. Chicago, Ill. October 25–29.

American Dental Association. Atlantic City, N. J. July, 1937.

American Heart Association. Atlantic City, N. J. June 7–11.

American Home Economics Association —30th Annual Meeting. Muehlebach Hotel, Kansas City, Mo. June 21–25.

American Hospital Association. Atlantic City, N. J. September 13–17.

American Medical Association—Eighty-eighth Annual Session. Atlantic City, N. J. June 7–11.

American Physical Education Association. New York, N. Y. April 21–24.

American Radium Society. Atlantic City, N. J. June 7–8.

American Society for Clinical Investigation. Atlantic City, N. J. May 3.

American Society for the Control of Cancer. Campaign of Education Throughout the United States. March.

American Society of Heating and Ventilating Engineers—Semi-Annual Meeting, 1937. New Ocean House, Swampscott, Mass. June 24–26.

American Society of Medical Technologists. Atlantic City, N. J. June 7–9.

American Therapeutic Society. Atlantic City, N. J. June 4–5.

American Water Works Association—Four States Section (Eastern Pennsylvania, Maryland, Delaware, Washington, D. C.) Joint meeting with Pennsylvania Water Works Operators Association. Bellevue-Stratford Hotel, Philadelphia, Pa. April 22–23.

Arizona Public Health Association—joint meeting with New Mexico Public Health Association (during annual meeting of Western Branch, A.P.H.A.). Phoenix, Ariz. April 12.

California Tuberculosis Association. Riverside, Calif. April 5–6.

Canadian Public Health Association. Chateau Laurier, Ottawa, Ont. June 17–19.

Canadian Tuberculosis Association. Chateau Laurier, Ottawa, Ont. June 17–19.

Conference of State and Provincial Health Authorities of North America. Washington, D. C. April 5–6.

Connecticut Public Health Association. May, 1937.

First International Conference on Fever Therapy. March 29, College of Physicians and Surgeons, Columbia University; March 30, 31, Hotel Waldorf-Astoria; New York, N. Y.

Health Officers and Public Health Nurses Annual Conference, under the auspices of the New York State Department of Health. Grand Union Hotel, Saratoga Springs, N. Y. June 22–24.

May Day–Child Health Day 1937. Saturday, May 1.

Medical Society of New Jersey. Atlantic City, N. J. June 1–5.

Michigan Association of Industrial Physicians and Surgeons. Hotel Statler, Detroit, Mich. May 3–7.

Mid-west Conference on Occupational Disease. Hotel Statler, Detroit, Mich. May 3–7.

Minnesota State Medical Association. St. Paul, Minn. May 3–5. (Congress of Allied Professions, May 3.)

Missouri Public Health Association. Springfield, Mo. April 29–30.

Mother's Day. May 9.

National Academy of Science. Washington, D. C. April 26–28.

National Association of Insecticide and Disinfectant Manufacturers, Inc. Chicago, Ill. June, 1937.

National Boys and Girls' Week. April 24–May 1.

National Conference of Social Work. Indianapolis, Ind. May 23–29.

National Congress of Parents and Teachers, 41st Annual Convention. John Marshall Hotel, Richmond, Va. May 3–7.

National Negro Health Week. April 4–11.

National Organization for Public Health Nursing. Silver Jubilee Meeting—in conjunction with Annual Meeting of the American Public Health Association. Hotel Pennsylvania, New York, N. Y. October 4.

National Tuberculosis Association. Milwaukee, Wis. May 31–June 3.

National Tuberculosis Association—Los Angeles Institute for the Training of Tuberculosis Workers. Los Angeles, Calif. June 15–30.

New England Health Education Association. Annual Meeting. Massachusetts Institute of Technology, Cambridge, Mass. June 4–5.

New Mexico Public Health Association—joint meeting with Arizona Public Health Association (during annual meeting of Western Branch, A.P.H.A.). Phoenix, Ariz. April 12.

New York Heart Association (Heart Committee of the New York Tuberculosis and Health Association), meeting jointly with the Medical Section of the New York Academy of Medicine. New York Academy of Medicine, 2 East 103 Street, New York, March 16, 8:30 P.M.

Northern California Public Health Association. March, 1937.

Ontario Health Officers' Association. Chateau Laurier, Ottawa, Ont. June 17–19.

Smoke Prevention Association. New York, N. Y. June.

Society of State Directors of Physical and Health Education. New York, N. Y. April 21–24.

State and Provincial Health Authorities of North America—Annual Meeting. Washington, D. C. April 7–8.

State and Territorial Health Officers Conference with the Surgeon General. Washington, D. C. April 7–8.

Western Branch, American Public Health Association—Eighth Annual Meeting. Phoenix, Ariz. April 13–15.

FOREIGN

Fifth International Congress of Hospitals. Paris, France. July 5–11.

Health Congress of The Royal Sanitary Institute. Birmingham, England. July 12–17.

British Medical Association. Belfast, Ireland. July 20–25.

British Dental Association. Cambridge, England. July 30–Aug. 3.

Seventh Biennial Conference, Health Section of the World Federation of Education Associations. Tokyo, Japan. August 2–7.

Fourth International Pediatric Congress. Rome, Italy. September 24–30.

Second International Congress for the Protection of Infancy. Rome, Italy. October 4–8.

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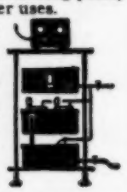

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